C Q — T V

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Membership enquiries should be sent to the Membership Secretary.
Please address your letters to the most suitable club official, and enclose a s.a.e.

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CONVENTION 1978

PLACE
CONWAY HALL
RED LION SQUARE
LONDON W. C. 1.

DATE
SATURDAY SEPTEMBER 23rd 1978

TIME
11am to 5pm

*Amateur exhibits
*Professional stands
*Lectures

The Club Annual General Meeting is due to be held during the Convention; any member wishing to raise a matter at the AGM should send details in writing to the Secretary well beforehand, so that a printed Agenda may be compiled.
According to the Constitution, half of the Committee must resign at the AGM. Nominations for the new Committee, which will be elected at the meeting, should also be sent to the Secretary.

A LIST FOR YOUR DIARY OF FUTURE EVENTS

RSGB Amateur Radio Exhibition at Alexandra Palace	May 5 & 6
International atv Contest	Sept 9,10
BATC 1978 Convention	Sept 23
SSTV Activity Week-end	Oct 7-8
Albatross SSTV Contest	
Leicester ARRA Exhibition	Nov

tv on the air by John Wood G3YQC

You may have noticed that we have recently been besieged by gales and storms, not to mention snow and ice. After this I wonder whether there are any aerials still up. Anyway, it has provided an opportunity (albeit enforced) to service the beams and rotator. I hope no one suffered too much damage though.

Steve G8KUX has been on the move again. This time he finds himself in Ipswich, and expects to be in his permanent accomodation by March where he will be able to erect some aerials. Steve would like to know if there are any stations in his area who are interested in fast-scan TV. The new location looks promising with the prospect of working into Holland a distinct possibility. His address is J/T S.J. Cowie, 23, squadron, RAF Wattisham, Ipswich, Suffolk.

Peter Lindsley G3UDV a new station from Ealing in London hopes to be transmitting ATV soon. Peter is building the DJ4LB transmitter, but parts are rather slow to arrive. He suggests that since the transmitter is so popular, perhaps someone should publish a list of suppliers of the various parts. A good range of equipment is already available, to wit: the C Q - T V single chip SPG, a JVC matic colour recorder, a Sony ½inch monochrome recorder and camera outfit and the main station camera which is an ITC 5000 with viewfinder.

Peter informs us that G4CRG and G4CRJ are very active in his area and he wonders if there is a B.A.T.C. membership list published. " 'fraid not, Peter, but it's a thought and thanks for the suggestion".

Dunstable in Bedfordshire is a familiar name in the ATV world although activity has dropped off recently, Graham Shirville G3VZV however, has come up with the following resumé of local activity. TV transmitting stations are: G4CPE, G8NOH, G4FNS and himself G3VZV (soon to be QRT for a while due to a change of QTH). There are many "receive only" stations around as well.

G4CPE has made colour transmissions and is also active on 23cms. using a 28 MHz video modulator into a transverter with a 2C39A final. A 23cms to 2 meter converter is being tried feeding a VHF varicap tuner, (the cheap variety). I'm sure we would all like to hear more of this 23cms set-up.

Graham would like to suggest a weekly activity night for ATV. This has been tried before of course, and there is no reason why it shouldn't work. How about letting me know of your preferences for a day, so that we can please as many people as possible and give the idea a chance. 8 to 10 pm would probably be convenient for most people.

From the Dunstable area for instance, the following can usually be worked successfully: Harrow, Watford, North London, Cambridgeshire, South Northants, and North Bucks. As Graham says, it will need proper publicity viz; C Q - T V, Wireless World, Rad' Comm', Short Wave Magazine and RSGB news bulletins.

If there is a reasonable response, I would willingly undertake this work. So if you are interested, please let me know as soon as you can.

That seems to have worked through the mail for this time. Incidentally, I would still like photos which could be used in this column so please see what you can dig out and send them with any other news to: TV on the Air, 54 Elkington Road, Yelvertoft, Northampton NN6 7LU. Tel. (0788) 823250.

Letters to the Editor

Dear Sir,

I am a member of the British Amateur Television Club and receive the journals regularly, but I cannot remember a section devoted to members, not active licensed amateurs but those who just receive video on 70cm. I do receive 70cm vision and have obtained very good pictures from G8EQZ Rainham, Kent and captions from G3UNT Maidstone, Kent. The power used at the time of transmission heard over the sound channel on 2 meters was 10 watts. I am situated approximately 10 miles from G8EQZ and 25 miles from G3UNT. In the case of G8EQZ the picture was entirely free of white noise. I congratulate G8EQZ for a perfect picture make-up, plenty of detail.

My equipment is a Mullard Varicap ELC1043 UHF tuned into a standard 625 line tv. The aerial is a 46 element 'J' beam cut to 70cm 20ft. above sea level. The tuning voltage is 0.4 volts d.c. The frequency of G8EQZ in 433.75 MHz. I have also received continentals of 70cm, but not vision. I would appreciate it if some mention could be made of listener only members.

Looking forward to receiving more video transmissions and reading the journal.

N. Silveston
82 Coronation Road,
Sheerness, Kent. ME12 2QP

Dear Sir,

May I on behalf of all members of B.A.T.C. take this opportunity to thank, all those responsible for the 2nd edition of Amateur Television, for and excellent and informative book. However, I have one small criticism to make, and this concerns parts of Chapter 2, Aerials and Reception. Mr. Chivers, the author, states that his work involves him in the erection of tv aerials and it seems that in writing about the erection of amateur aerials, he has confused the two services. He states that, he has yet to see any aerial with dozens of elements outperfor a well designed 10 element aerial, due no doubt to the well known fact that the more elements you add, the lower the impedance becomes. While this may be true of commercial tv aerials, it certainly not true of commercial amateur antennas, as the baluns in Jaybeam aerials prove. They produce an 88 element aerial with 50 ohms impedance as well!

Also, his instructions for setting up aerials to assume that we will only work one station in nne direction. Not so. Surely, as some stations will be very strong and some very weak and all in different directions, we should go for the old maxim, as much gain as high as possible. Finally, may I say that no disrespect to the article or author is intended, merely an attempt to dispel any confusion which may arise.

D.J. Stanton G8HNN
55 Vauxhall Street,
Rainbow Hill, Worcester WR3 8PA.

SSTV MONITORS

by J. Brown G3LPB

It is hoped to cover a few of the monitors that hve been available to us. Some designs are still available and others have disappeared. As far as is known, all the data given is correct. In most cases designations and symbols are taken fram available ccts and data.

No. 1 The S.S.M.I. Monitor

A few years ago there appeared in many publications the first British designed monitor. Marketed by Messers. Spacemark, it was ahead of its time I felt. Available as a complete monitor at half the imported price or one could buy the kit, or just the two p.c. boards plus all the data. There was also made available certain special parts, including mains transformer, EHT capacitors, even to a focus coil (electrical) and its associated power and regulated board. Utilising some 18 transistors and 8 ICs, it was solid state. It was a well designed and engineered project. The booklet with it contained a huge amount of data. Alignment was quite easy and it produces some very fine contrasty pictures, and all at a reasonable price.

One board contained the input, limiter, video stage with all sync and timebases on the same board. This made for ease of construction. The other board contained the power supply components except the transformer or the R.F. generator. This was again a cheapish commercially available unit. Even the EHT for the CRT was on this board as it contained the rectifiers and capacitors, plus a regulator for the EHT side. It was obvious a great deal of forethought went into its conception, and many have worked with not even the toroids being "tuned" to their required frequency. I have never seen any mods as such in print, or even referred to. However, there are some ideas for the perfectionist. I carried these out on one model and could really see little or no difference. Colourwise maybe a little. One little thing that cropped up was the fact, P4 the sync pot could be tweaked too far, too quickly and the poor old sync transistor went into orbit and self destruction took place. This was stopped by breaking the print, drilling two holes and fitting a 1K resistor in series. In complete fairness, the monitors have had 3½ years use, sometimes running all day at exhibitions for 10 hours and only one failure, an F.E.T. Tuning is made much easier with the LED used, and tuning in listening to the audio, and when the audio and LED flash in sympathy with each other, pressing the manual reset button produces a good picture. One model did not even have theIC regulators fitted just aPNP and NPN transistor with the usual zener in the base. I use a yellow or deep yellow filter on the face of the CRT to diminish the "white painting line of the scan", it makes it pleasing to see. I have used from 3kV to 8kV, admitted the 8kV gave a better brighter glow, but 3kV was very good. It seems a great shame that this has disappeared as it made SSTV very possible for many at a reasonable price. The following are not mods but suggestions that may in some cases be needed. All are the designer approved and not plain guesses, so there is no fear of mistakes, and I feel sure we would have seen many other things from the same source. Starting with board 1, the video board, the changes are given and reasons for them also in case someone has these little snags as always exists with many enterprising things.

None of these mods are difficult. In some cases one has to think first and act after. Generally easily done. All numbers etc. refer to the cct which comes with the boards, or the complete article. In many cases these little things have been done,either by a redesigned board or by other ways. I have mentioned the first adding the 1K resistor between P4 and the d.c. supply to the emitter of T3 this is done by drilling two 1mm holes and mounting the resistor vertically, and stops the T3 going u/s. C15 should be 1uf. D10/11 are deleted and links in their place, when R34 and 51 become 22K. R11 can be experimented with in value of 1.4 to 2.2K to improve any overshoot if this occurs. This also depends on the CRT used.

A 1uf disc from Pin 10 to earth stops any chance of self oscillation ,or "hiccup" that may be experienced inthe line cct also it cns be fitted in the frame by fitting a 1 from Pin 15 to earth, or even across the actual scan coil windings. At d.c. it has little or no effect on the line side, or frame coils the DCr of each being low.

Due to the unavailability of certain transformers used as inductances in the original version, boards were modified to take readily available and redesigned transformers. The later ones used TT£ transformers, in these cases there is a change in some Cs C5 becomes .015uf, c7 becomes .1uf and C6 deleted or use a 3.3kpf (.0033). It gives little more black using the capacitor.

Due to some FET characteristics and its susceptibility to temperature change it sometimes needs to take the source resistor R30 and R55 to earth instead of the neg 12 volt line. This depends on the FETs used. No certain make seems to be culprits, just odd ones.

If one would like black level clamping, the video cct can be "altered" by removing R10, R11, C8 and C9 and earthing the emitter of the video transistor and introducing DC bias. This is obtained from the existing 160 volt line where the hot side of the 47K video load resistor comes from. The added res. from here to the base is really an A.O.T. value (adjust on test) and can be from 4.7 to 12 megs. dependent on the viewers choice. Passing here, one monitor was modified by increasing the value of the F charge condenser and adding a seperate line pot. These were switched to select 120/128 lines and 256. It works very fine choosing the C for the correct timing I used 2-4 .7uf tants in parallel, but as there is seemingly so little activity, this may not be worthwhile.

Power board

Originally 2-82 volt zeners were used for the HT regulation. These were hard to come by, so some boards may be altered to use 3-57 volt in series. These are D10/D11 and added D16 in the cct. Easily done by cutting the print and mounting the zeners vertically wired in series.

A 470 ohm stopper from Pin 6 of IC6 is assistance here, again cut print, drill two 1mm holes and mount R vertically. Also introduce little feedback to IC6, add a 2 meg R from Pin 6 IC6 to Pin 2 IC6. Easily done on the back print side of the board. I tnink it should be emphasised again, these are not mods, but things that are introduces to give **a slightly better** performance.

One transformer for the supplies I had contained a winding which was originally designed for the focus supply or similar purpose. This was used as a voltage doubler cct to drive the EHT generator seperately from the other supplies and worked very fine. This unit then worked on a higher supply yet was not in any way overrun and has had three years use.

In complete fairness, it was a well-engineered job and a great pity that it has disappeared as I feel sure we would have seen some new if not revolutionary bits of gear from the same source. As far as is known, there are no boards or parts available, nor are there any of the special tapes that were also supplied from the same firm and include all the data with the best of my knowledge. If I can assist anyone I will most certainly be glad to do so. Regret I cannot supply any complete ccts. A SAE would be appreciated.

No. 2 The G3RHI Monitor

My first experience of this G3RHI monitor was the original one as published by B.A.T.C. There were a few misprints but it looked as if it had all the right ingredients. A letter stated there were no pc boards for this so a start was made to produce a pc board setup. One board contained the video and sync section whilst the other contained the time base sections. Careful building and wiring was carried out. The whole unit was wired up and the "great day of judgement" came. Switch on, feeding in a copy of a test tape, with little or no knowledge, as the book did not contain many of the answers to my questions. Certainly there was disappointment. There always is. But the main snag was the sync pot. I could not seem to get it to trigger both frame and line correct. Perseverance prevailed and I did see a couple of scans of a copy of Cop. Mcdonalds original tests. This was an absolute thrill, but the snag still persisted so a letter to Bert RHI suggested a mod which made it work in a way but the project was dropped. Recently it came to light again. This time using the published cct in the Slow Scan Television book by B.A.T.C., with the new time base ccts and works fine now. Admitted I still have to fiddle with the knob on the front panel designated SYNC, a multiturn pots assists and if the tuning is OK, the pictures are quite good. I still feel its a pity that the pc boards are not made available so we can all have at least a standard design (something like G2DAF did for SSB). The original model used all discrete components, whilst the new design uses an IC in the time base. Could not someone do a pc set of boards? I KNOW A VERY SIMILAR DESIGN is available, and it is covered by No. 3 in this series. At least G3RHI started something, and followed it by the FBS etc. The original worked quite well using G3LEE mod, using unijunctions to drive the time bases so we had a raster on screen at all times. At least it worked and when sync was received the UJ signal was that much slower that the received signal took over. I had to amplify the received sync signal a little but in all it was an enjoyable excercise, and I suppose an introduction to SSTV for many.

No. 3 The M.K. Products SSTV Monitor

As far as I know this is the only still available source of a complete slow scan monitor. Very akin to the G3RHI monitor with various changes, it is seemingly the only reasonably priced chance to get SSTV. Many bits and pieces are available.

The setup is contained on a series of pc boards. These are supplied with a very comprehensive booklet containing all one needs to know to get pictures in a minimum of time with a minimum of expense. If needs be the boards can be obtained already built up and tested. We can even get a pc board for the power supplies including the RF eht generator.

Cabinets and metalwork are also available. This I feel is an excellent service, and whilst never having seen one in action, I have heard good reports of it. Remembering, it is only as good as it is made and used.

The boards come ready to use and are 5 active boards plus a baseboard. We can also have the power supply board for the low volt side plus another for the valve type EHT system.

The boards are as follows: 1. The limiter and input board with the sync sep. 2. Monostable board. 3. Video amp board. 4. Frame timebase. 5. Line timebase board. These are all seperate and drop into edge connectors which are wired from under hence all we see on top are the five boards standing vertically as suggested in the book. Also offered are things like wrap over cover and cabinet, and presumably all the small amount of metalwork. In natural finish, these can obviously be cleaned and sprayed using undercoat and aerosol spray to the required colour to match the rig. There are 4 selected inputs selected by front panel switch. Likewise, there is a record/playback/mike select switch, plus brilliance, contrast and a few controls. Using a 5FP7 CRT, the only snag is the obtaining of scan coils and magnets for focus but I understand these can oftimes be supplied. There is available a Phase Locked Lopp board for the perfectionist. No visual aid is included for the tuning, but with careful receiver tuning and setting of the sync pot I hear the M.K. produces some nice pictures. The book supplied contains all the necessary data, circuitry and layout of boards and written instructions of the method of construction, and if allowed should be a "first go". One thing that is appealing one with the external mother board setup work on the boards in ease and out of their respective edge connectors as the extension allows this. Being sync driven, it needs careful tuning of the not so strong signals, as the sync pot setting controls both line and frame and practice makes one careful using this pot. There are lots of these in use and one never reads of "mods", so they must be good in actual use. I have given no data re M.K. prices, or even their address but I will on receipt of an SAE be pleased to answer any queries re these things. I feel in fairness to M.K. they are doing a service without being recognised, as the prices have not varies but a few pence since their introduction.

No. 4 The W6MXV Monitor

Although never seen, I understand there are boards and kits also available for this designed monitor even from the designer, but I have no real proof of this. There are quite a few in use in U.K. and are seemingly good in operation - a bit fiddly to use on 120 and 128 lines, but again careful use proves this. I have heard the noise immunity (a curse to SSTV) is excellent and it also includes a "magic eye" for tuning aid.

It is solid state. Uses both discrete components and ICs,all obtainable in U.K. No mention is made of scan coils and focus magnets, so I imagine one has to seek about for these.

Again, a very good engineered design, and pc boards make it quite easy. It includes a very fine eht generator using a 88uH toroid with a RF oscillator and a regulated supply for this plus the low volts.

There are many write-ups available about this monitor, and maybe members have much more data than generally available. I did read once the complete thing set of boards are available from W6MXV ready to wire and go.

No. 5 The SMØBUO Monitor

This is a very sophisticated monitor using hard to get bits, but completely covered in a C Q - T V issue with mods for available bits and pieces obtainable in U.K. This has a continuously running raster using SCRs or thyristors, again great. Trouble made to provide this noise immunity. It looks a very fine design and as far as is known no pc boards are available for this project, but many have copied it using the third method "veroboard" or support pins and hand wired in under a board. The original cct appeared in Radio Communication 1971, February issue. Whilst many suggestions and ideas were shown in C Q - T V February 1974 issue by G3ZJO. It also uncovers a misprint inthe original article.

Finally, there are more monitors than are mentioned here, like the very good designs that have come from W land, but a marvellous QSO some time back was when I was told "No, I have yet to find a better performer than my old original valve version of Cop McDonald's monitor." Surely a statement that makes it all worth while for Cop who originally thought up and with a few others, pioneered SSTV. I wonder what they think today with all the commercial ones?

Since finishing these details off, I received a communication that there are available a slow scan kit from Venus. This is the component version of the Venus monitor that has been shown at many exhibitions. Again, this comes absolutely complete with bits and even a test tape. Remember this was recorded at 60 cycles, so do not go a lot using this on tests using 50Hz recorders.

If you think I can assist in any way, please ask, with a SAE for a reply.

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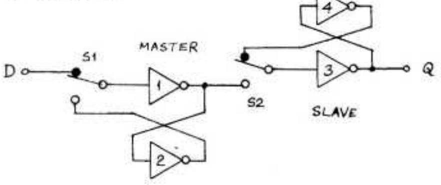
PART 3

Bistables

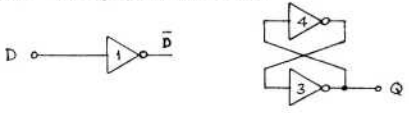
Dual D-Bistable 4013

This is completely different from any previous bistable as it uses transmission gates to change around the internal logic.

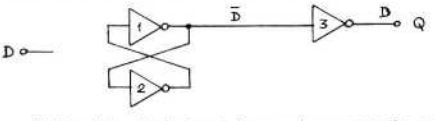
It consists of a master-slave arrangement of two R-S bistables.



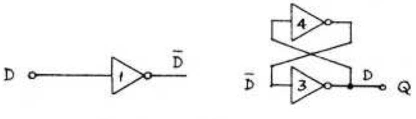
S1 and S2 are changeover switches comprised of transmission gates operated by the clock input. As shown the clock is low and the slave bistable contains latched data from a previous time. The master bistable is disconnected and its loop opened so that gates 1 & 2 are in series. The input data level is therefore present on both contacts of S1 and inverted on S2 N.O. contact. The system is like this:



The clock input is now taken high to change over the switches. Since S1 had the same information on both contacts there is no change at the output of gate 1 which still has $\overline{D}$ on it. S2 connects gate 3 to $\overline{D}$ and opens the bistable so that Q now receives the data D. S2 N.C. contact then has $\overline{D}$ on it.



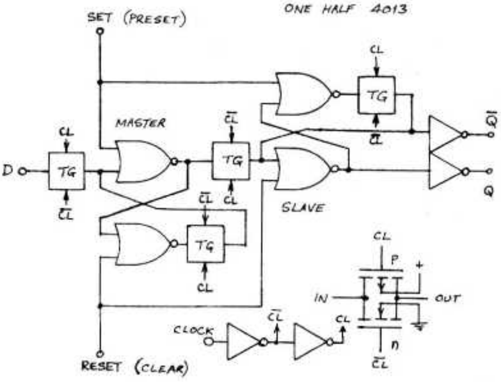
Taking the clock input low again causes the gates 3 & 4 to become a bistable again and it still gets $\overline{D}$ information at the input of gate 3 and does not change state.



Again the data is passed to the output of gate 1, and so on.

The master bistable is loaded during the clock-low state without affecting the output. At the change to the clock-high state it transfers the last data level to the Q output where it is held in the master bistable because the data input is disconnected.

When the clock goes low the data held is transferred to the slave bistable and again held because the slave is disconnected from the master. The master is being reloaded at this time with new data.



The D-Bistable thus changes output state on the positive clock edge.

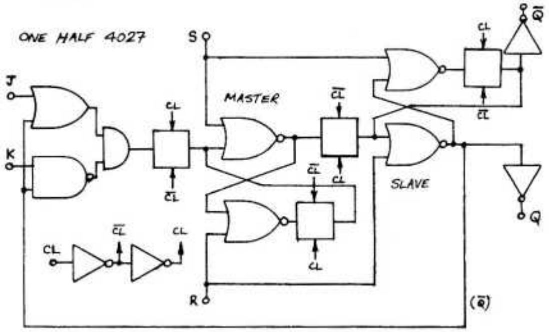
The 4013 also has Set and Reset inputs which over-ride the bistable states. These operate on positive levels because the bistables are constructed from NOR-gates. (This is the positive-logic orientation referred to earlier in these articles. TTL uses negative logic here).

As with other D-Bistables, connecting the $\overline{Q}$-output to the D-input results in alternate data levels and the bistable toggles (divides by two).

There is a Quad D-Bistable, 4076, which has disabling inputs and outputs. It can be used in a Tri-state busbar system.

Dual J-K Bistable 4027

There are only a few J-K bistables in the CMOS range and the simplest is the 4027. It is very similar to the D-bistable 4013 differing only in the extra gating for the J and K inputs before the master bistable.



The J and K inputs are selected alternately by the $\overline{Q}$-output from the slave bistable - when Q is high J is enabled. The J-K data is therefore presented to the master bistable in place of the D data in the D-bistable.

If both J and K are high then this data becomes $\overline{J}$ and K alternately, i.e. 1 and 0, and the bistable toggles.

If K is taken low whilst J is high then Q can be clocked high but will not be able to be clocked low. Similarly, with J low and K high, Q can only be clocked low.

When both J and K are low no change will occur on any clock pulse. The active edge is the positive-going one for all the bistables.

There are two single bistables; the 4095 having three J and three K inputs (which AND together) and the 4096 which is the same except that one of each inputs is inverted.

Acknowledgement

The author wishes to thank the directors of Image Video Ltd., Scarborough, Ontario, Canada, for permission to publish this article.

One comment which has come up frequently of late is that C Q - T V has published very little on the subject of fibre optics and its application to amateur television. In fact it looks as if everyone in BATC wants to know about it, but no one has anything to tell! So if any member has been experimenting with fibre optics, or has any relevant knowledge on the subject, please put something down on paper and send it to the Editor for publication.

Thank-you to all those who responded to the plea for helpers at exhibitions in the last issue - some of you will probably by now have been asked to help at some forth-coming events. However our list still does not cover the whole country, so if any members feel they could offer their services for occaisional help at exhibitions and shows where BATC is involved, please write to Mike Crampton, whose address is
16 Percival Road
Rugby, Warwickshire.
A particular plea for help in this respect is for members who could help with the Club stand at the RSGB show at Alexandra Palace in May by providing slow scan equipment for display. If you live in the area and could help, please contact Tom Mitchell whose address is 30 Old Farm Close, Hounslow, Midx

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Suitable for broadcast and closed circuit applications

Standard length 6.3 V 90 mA	Standard length 6.3 V 300 mA	Short length 6.3 V 90 mA	Description and application
9677S1	9728S1		High grade tube for Broadcast Studio use.
9677S2	9728S2	9706S2	General tube for Broadcast and Educational Studio use.
9677F1	9728F1		High grade tube for Broadcast Telecine use.
9677F2	9728F2	9706F2	General tube for Broadcast and Educational Telecine use.
9677BX	9728BX		High grade tube for use with Medical X-Ray equipment.
9677B	9728B		High grade tube for Industrial use under low light level.
9677C	9728C	9706C	General Industrial tube.
9677M	9728M	9706M	Tube to a relaxed blemish specification.
9677 Amateur	9728 Amateur	9706 Amateur	Economical tube for experimental use.

SPECIAL PURPOSE 26 mm (1 in) SEPARATE MESH VIDICONS

Tubes with special faceplates, targets or other features making them suitable for particular applications. Generally available in two grades, 1 and 2, the latter to a relaxed blemish specification.

9677D	(90 mA heater)	Tubes with fibre optic faceplates for direct optical coupling.
9728D	(300 mA heater)	
9677Q	(90 mA heater)	Tubes with quartz faceplates for use in fields of nuclear radiation.
9728Q	(300 mA heater)	
9677UV	(90 mA heater)	Tubes with quartz faceplates and unity gamma ultra violet sensitive targets. The red response is negligible (2500 Å to 6000 Å).
9728UV	(300 mA heater)	
9730*	(90 mA heater)	Short length rugged construction (replacement purposes only)
9802	(90 mA heater)	Short length tube with electrostatic deflection and focus.
9802D	(90 mA heater)	Short length electrostatic tube with fibre optic faceplate for direct optical coupling.
9802Q	(90 mA heater)	Short length electrostatic tube with quartz faceplate for use in field of nuclear radiation.
9745	(90 mA heater)	Electrostatic tube (replacement purposes only)

18 mm (⅔ in) SEPARATE MESH VIDICONS

9831S	(90 mA heater)	Broadcast and Educational Studio use.
9831F	(90 mA heater)	Broadcast and Educational Telecine use.
9831	(90 mA heater)	General purpose tube for use in compact closed circuit television cameras.
9831 Amateur	(90 mA heater)	Economical tube for experimental use.
9831D	(90 mA heater)	Tube with fibre optic faceplate for direct optical coupling.
9831Q	(90 mA heater)	Tube with quartz faceplate for use in field of high nuclear radiation.
9831UV	(90 mA heater)	Tube with quartz faceplate and unity gamma ultra violet sensitive target.

13 mm (½ in) SEPARATE MESH VIDICONS*

9737	(90 mA heater)	Similar to 9738, with a unity gamma fine grain target for slow scan applications such as star tracking.
9738	(90 mA heater)	Rugged construction for general use. The resolution capability is exceptionally high for this size of vidicon.
9738D	(90 mA heater)	Tube with fibre optic faceplate for direct optical coupling.
9738Q	(90 mA heater)	Tube with quartz faceplate for use in field of high nuclear radiation.
9738UV	(90 mA heater)	Tube with quartz faceplate and unity gamma ultra violet sensitive target.

DEVELOPMENTAL VIDICONS

D2003*	(90 mA heater)	13 mm (½") diameter electrostatic tube.
D2003D*	(90mA heater)	Electrostatic tube with fibre optic faceplate for direct optical coupling.
D2004*	(90 mA heater)	13 mm (½") diameter electrostatic tube with minimum overall dimensions.
D2005	(90 mA heater)	50 mm (2") diameter electrostatic tube.

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* Mesh connection brought out adjacent to target connection.

Vidicon Tube Interchangeability Information

Tube to be replaced			Suggested EMI replacement (Separate mesh construction)			
Type No.	Heater current at 6.3 V, mA	Integral or separate mesh	Direct replacement type	Similar replacement type	Heater current at 6.3 V, mA	Refer to notes
2260IND	95	SM	9677C	–	90	–
2260NOR	95	SM	9677S1 or S2	–	90	–
2260ROE	95	SM	9677BX	–	90	–
4478	600	IM	–	9728M	300	1 & 2
4488	600	IM	–	9728M	300	1 & 2
4569	95	SM	9677D	–	90	–
4589	600	SM	–	9728D	300	1
4809	95	SM	9677F1	–	90	–
4809B	95	SM	9677F1	–	90	–
4846	95	SM	9677S1	–	90	–
4846B	95	SM	9677S1	–	90	–
7038	600	IM	–	9728F1 or F2	300	1 & 2
7226	150	IM	–	9677B or C	90	1 & 2
7262	95	IM	–	9706M	90	2
7262A	95	IM	–	9706C	90	2
7325	600	IM	–	9728C	300	1 & 2
7735	600	IM	–	9728M	300	1 & 2
7735A	600	IM	–	9728C or M	300	1 & 2
7735B	600	IM		9728S2	300	1 & 2
8484	600	IM	–	9728B	300	1 & 2
8507	600	SM	–	9728C or M	300	1
8507A	600	SM	–	9728S2	300	1
8541	95	SM	9677C or M	–	90	–
8541A	95	SM	9677S2	–	90	–
8541AX	95	SM	9677BX	–	90	–
8572	600	SM	–	9728F2	300	1

Tube to be replaced			Suggested EMI replacement (Separate mesh construction)			
Type No.	Heater current at 6.3 V, mA	Integral or separate mesh	Direct replacement type	Similar replacement type	Heater current at 6.3 V, mA	Refer to notes
8573A	95	SM	9706S2 or C		90	
8604	95	SM	9677F2		90	
8625	600	SM		9728S1	300	1
8626	95	SM	9677S1		90	
8823	95	SM	9831		90	
8844	95	SM	9831	–	90	
9620	95	IM	–	9677M	90	2
9677P	90	SM	9677M		90	
9677SC	90	SM	9677S1	–	90	
9697	90	SM	9738		90	
10667F	600	IM		9728F2	300	1 & 2
10667G	600	IM		9728C	300	1 & 2
10667M	600	IM		9728M	300	1 & 2
10667S	600	IM		9728S2	300	1 & 2
10667SC	600	IM		9728S1	300	1 & 2
10667UV	600	IM		9728UV	300	1 & 2
55850AM	90	IM		9677M	90	2
55850F	90	IM		9677F2	90	2
55850N	90	IM		9677C	90	2
55850S	90	IM		9677S2	90	2
55850SR	90	IM		9677B	90	2
55851AM	90	SM	9677M		90	
55851F	90	SM	9677F2		90	
55851N	90	SM	9677C	–	90	–
55851S	90	SM	9677S2		90	–
55851SR	90	SM	9677B	–	90	–
55852AM	300	SM	9728M	–	300	–
55852F	300	SM	9728F2	–	300	–
55852N	300	SM	9728C	–	300	–
55852S	300	SM	9728S2	–	300	
55852R	300	SM	9728B	–	300	–

Suggested Direct Replacement Types are tubes which will operate directly in equipment designed around the original types. The tubes may not, however, be identical in all respects, e.g. spectral response.

Suggested Similar Replacement Types are tubes which will operate in the majority of equipment designed around the original types. It may, however, be necessary to make some minor modification to the equipment.

Note 1 Care should be taken when using tubes of differing heater currents, that the supply arrangement is suitable.

Note 2 When using a separate mesh (SM) tube in place of an integral mesh (IM) tube, electrodes G3 and G4 should be strapped together on the tube socket, or the camera modified electrically for separate mesh operation. The latter will normally give an improved performance in resolution and shading.

Tube to be replaced			Suggested EMI replacement (Separate mesh construction)			
Type No.	Heater current at 6.3 V, mA	Integral or separate mesh	Direct replacement type	Similar replacement type	Heater current at 6.3 V, mA	Refer to notes
C102A	300	SM	9728C	–	300	–
C102B	95	SM	9677C	–	90	–
C103A	300	SM	9728S2	–	300	–
C103B	95	SM	9677S2		90	–
C104A	300	SM	9728F2		300	–
C104B	95	SM	9677F1	–	90	–
C105A	300	SM	9728Q	–	300	–
C105B	95	SM	9677Q		90	–
C9132	300	IM		9728C	300	2
C9132A	300	SM	9728C	–	300	–
C9133	300	IM		9728S2	300	2
C9133A	300	SM	9728S2	–	300	–
E1170	95	SM	9831	–	90	–
HS200	600	IM		9728C or M	300	1 & 2
HS200A	600	IM		9728S2	300	1 & 2
HS201	600	IM		9728B	300	1 & 2
HS201A	600	IM		9728B	300	1 & 2
MJ075	95	SM	9831	–	90	–
OB2	90	IM		9677M	90	2
[illegible]	90	IM		9677M	90	2
P810	600	IM		9728M	300	1 & 2
P826	600	IM		9728 Amateur	300	1 & 2
P841	600	SM		9728S2	300	1
P841X	600	SM		9728BX	300	1
P842	95	SM	9677S2	–	90	–
P842X	95	SM	9677BX	–	90	–
P843	600	SM		9728F2	300	1
P844	95	SM	9677F2		90	–
P846	600	SM		9728S1	300	1
P847	95	SM	9677S1	–	90	–
P848	600	SM	–	9728C	300	1
P848D	600	SM		9728M	300	1
P849	95	SM	9677C		90	–
P849D	95	SM	9677M	–	90	–
P860	600	IM		9728S2	300	1 & 2
P862	95	IM		9677M	90	2
P863	95	SM	9730	–	90	–
P864	95	IM	–	9677C	90	2
P866	95	SM	9706S2	–	90	–
P888	95	SM	9738	–	90	
P8030	300	SM	9728S2	–	300	–
P8031	300	SM	9728C	–	300	–
TH9801	150	SM		9677 Amateur	90	1
TH9806	150	IM		9677S2	90	1 & 2
TH9806PA	150	SM		9677S2	90	1
TH9807	150	IM		9677F2	90	1 & 2
TH9807PA	150	SM		9677F2	90	1
TH9808	150	IM		9677C	90	1 & 2
TH9808PA	150	SM		9677C	90	1
TH9808N	150	IM		9677Q	90	1 & 2
TH9810	150	SM		9677M	90	1
TH9812	150	IM		9677B	90	1 & 2
TH9812PA	150	SM		9677B	90	1
TH9814	150	IM		9706C	90	1 & 2
TH9814PA	150	SM		9706C	90	1
TH9815	150	IM		9677BX	90	1 & 2
TH9815PA	150	SM		9677BX	90	1
TH9817	150	IM		9677S1	90	1 & 2
TH9817PA	150	SM		9677S1	90	1
TH9818PA	150	SM		9677S2	90	1
TH9833	300	SM	9728C	–	300	–
TH9896	150	SM	–	9677UV	90	1
XQ1001	300	SM	9728B	–	300	–
XQ1002	300	SM	9728S2	–	300	–
XQ1003	300	SM	9728C	–	300	–

Tube to be replaced			Suggested EMI replacement (Separate mesh construction)			
Type No.	Heater current at 6.3 V, mA	Integral or separate mesh	Direct replacement type	Similar replacement type	Heater current at 6.3 V, mA	Refer to notes
XQ1004	300	SM	9728M	–	300	–
XQ1005	95	SM	9677B	–	90	–
XQ1006	95	SM	9677S2	–	90	–
XQ1007	95	SM	9677C		90	–
XQ1008	95	SM	9677M	–	90	
XQ1030	95	IM	–	9677M	90	2
XQ1031	95	IM	–	9706C	90	2
XQ1032	95	IM		9706M	90	2
XQ1040	95	SM	9677F2		90	
XQ1041	95	SM	9677BX		90	–
XQ1042	95	SM	9677S2		90	–
XQ1043	95	SM	9677C		90	–
XQ1044	95	SM	9677M		90	–
XQ1050	300	SM	9728F2		300	–
XQ1051	300	SM	9728B	–	300	–
XQ1052	300	SM	9728S2	–	300	–
XQ1053	300	SM	9728C	–	300	–
XQ1054	300	SM	9728M	–	300	–
XQ1060	300	SM	9728BX	–	300	–
XQ1061	300	SM	9728S1 or S2	–	300	
XQ1062	300	SM	9728C	–	300	–
XQ1063	300	SM	9728M	–	300	
XQ1064	300	SM	9728 Amateur	–	300	–
XQ1065	300	SM	9728F1 or F2		300	
XQ1066	300	SM	9728D1	–	300	–
XQ1067	300	SM	9728D2	–	300	
XQ1160	300	SM	–	9730	90	1
XQ1161	300	SM		9730	90	1
XQ1240	95	SM	9677C	–	90	–
XQ1241	95	SM	9677M	–	90	–
XQ1270	110	IM	–	9831	90	2
XQ1271	95	SM	9831	–	90	–
XQ1280	95	SM	9677BX	–	90	–
XQ1285	95	SM	9677D	–	90	
XQ1290	95	SM	9677BX		90	
XQ1291	95	SM	9677S1 or S2		90	–
XQ1292	95	SM	9677C		90	–
XQ1293	95	SM	9677M	–	90	–
XQ1294	95	SM	9677 Amateur	–	90	–
XQ1295	95	SM	9677F1 or F2		90	–
XQ1300	95	IM	–	9831	90	2
XQ1310	95	SM	9831		90	
20PE11	95	IM	–	9831	90	2
20PE13	95	SM	9831		90	
2255AMR	300	SM	9728M	–	300	
2255ENT	300	SM	9728 Amateur	–	300	–
2255F	300	SM	9728D	–	300	–
2255FIM	300	SM	9728F1 or F2	–	300	–
2255IND	300	SM	9728C	–	300	–
2255NOR	300	SM	9728S1 or S2	–	300	–
2255ROE	300	SM	9728BX	–	300	–
2255SF	300	SM	9728Q	–	300	–
2260AMR	95	SM	9677M	–	90	–
2260ENT	95	SM	9677 Amateur	–	90	–
2260FIM	95	SM	9677F1 or F2	–	90	–

AN ITS SELECTOR WITH FIELD IDENT

by D. J. Long G3PTU

In C Q - T V No 97 an article described a line selector, however with no ident. as to the field to be selected, which is important if off-air ITS is to be observed as it is not always the case that the same source of ITS exists on both fields.

The following unit will identify the fields and provide triggering for ITS on either field or both.

Originally the unit was built as an addition to a Telequipment Service Scope so details of how it was incorporated are included. However, it will be seen from the details that for incorporation into different equipment suitable interfacing can be designed.

V1 is the sync separator in the oscilloscope. The output waveform provides a negative edge for the triggering of the oscilloscope time-base.

The circuit function is as follows: TR1 simply inverts, cleans up the input waveform, and level shifts to TTL drive.

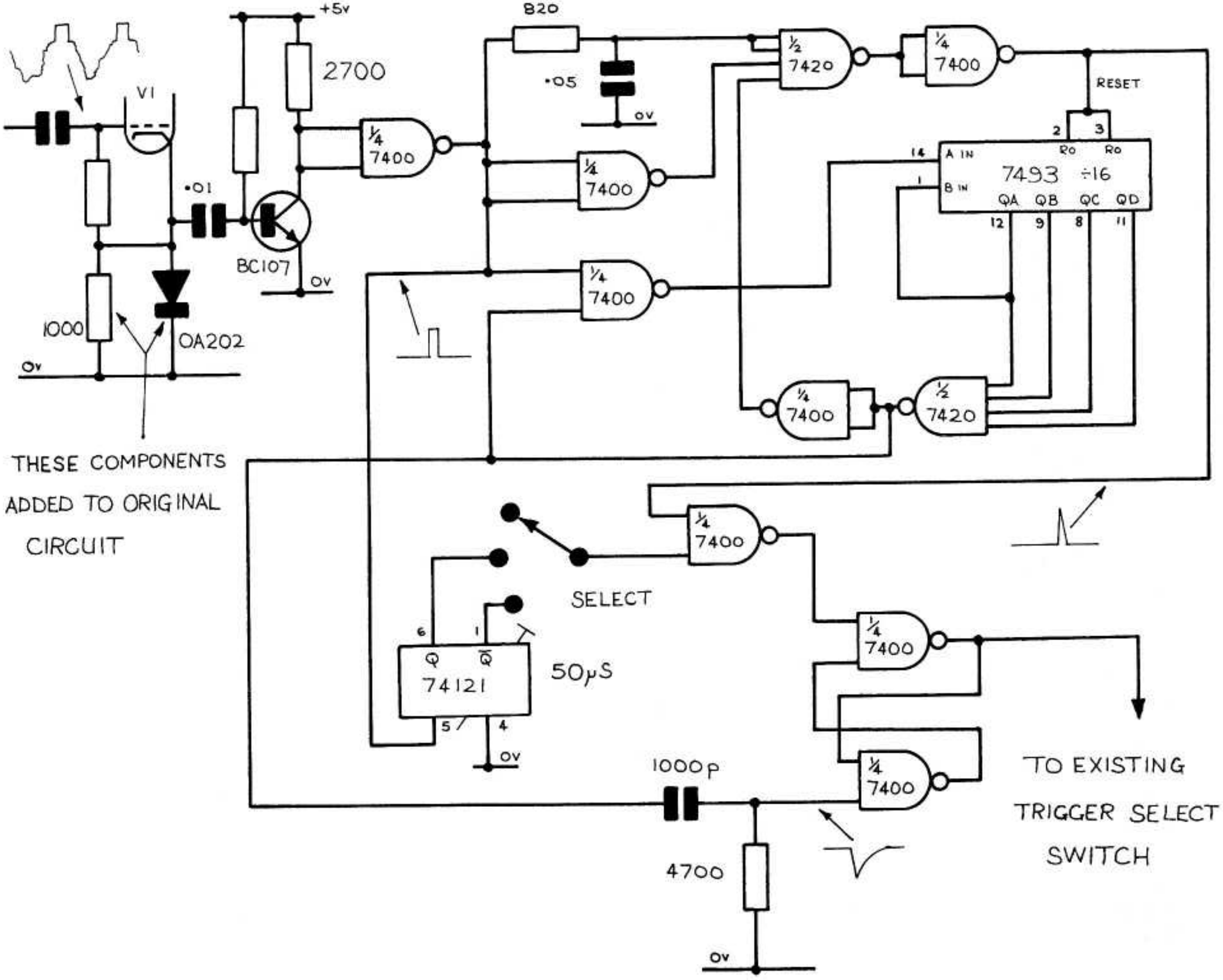
The 820 + .05us integrate the waveform so as to separate out the broads, the input of the 3 input gate being '1' during the broads, the remaining inputs being syncs, thus being '1' only during the tips of the broads, and finally the third input, likewise '1' when the counter is at all '1' up condition.

This same '1' up condition is also used without a convertor to inhibit further counting. The combined result of this is to provide a reset pulse of the first broad only, plus a count of 16 edges after this point in the waveform. Obviously any length of counter can be used here, or a monostable to give continuous tweak control. It should, however, not exceed one field length, otherwise things get difficult.

The monostable is triggered on the negative edge of syncs, the period being approx. 50us. A 74121 is the choice here as a non-retriggerable monostable must be used. The effect of interlacing being that the point in time at which the first broad pulse occurs, will on one field coincide with the monostable being during its 50 us time out period, on the other, the pulse being outside this period. Thus field ident is generated, when the bistable is set, reset being provided by differentiated '1' up condition from the counter.

From the bistable there is available an edge which at the selection of the switch will occur every field, or on either odd or even, timed 10 lines after the 1st broad. The counter will ofcourse have counted 15 as there are two edges per line during the remaining broads and the post equalisers. On the author's scope, with built-in delay in the trigger circuit and time-base, a line 10 trigger was just right to start the deflection in time to observe the slice on line 16.

The original circuit was published in CQ-TV 97, copies of which are available from BATC Publication


V1
•01
+5v
2700
BC107
0v
1000
OA202
0v
THESE COMPONENTS
ADDED TO ORIGINAL
CIRCUIT
¼ 7400
820
•05
0v
¼ 7400
¼ 7400
½ 7420
¼ 7400
RESET
2
3
Ro
Ro
14
A IN
1
B IN
7493 ÷16
QA
QB
QC
QD
12
9
8
11
¼ 7400
½ 7420
¼ 7400
SELECT
6
1
Q
Q̄
74121
50μS
5
4
0v
¼ 7400
¼ 7400
1000p
4700
0v
TO EXISTING
TRIGGER SELECT
SWITCH

REVIEW

CROFTON C1 CAMERA KIT

Having considered the merits of various surplus TV cameras the author decided that useful experience might be gained in constructing the Crofton kit. As it turned out the experience was derived not so much in the construction as in the lengthy adjustment procedure following completion.

The camera uses discrete transistors throughout, 26 bipolars and two FETs, in a straightforward and well-designed circuit. An LC oscillator, stable enough for amateur purposes provides line pulses, frame pulses being derived from AC mains. Two transistors are used in an automatic sensitivity control circuit and the head amplifier uses an FET. All d.c. voltages are regulated including the vidicon heater supply and the focus coil is supplied from a constant source.

Having sorted and laid out and labelled the 250 components it was pleasing to find that only three small resistors were missing and that every component could be readily identified from the components list. However, the constructional datum included is extremely limited, being restricted to two basic wiring diagrams and a couple of sheets relating to later modifications. The constructor expecting a Heathkit-type manual will be disappointed unless, like the author he prefers to exercise his personal ingenuity; Crofton clearly expect their constructors to be able to recognise such things as diode and capacitor polarities. About 200 components are crammed onto a single pcb, about 10" x 5", and the precise order of construction must be carefully considered although it is reasonably safe to solder components in order of increasing size.

A large capacitor might conceal several small resistors and it is important to check every component as it goes in. The wiring around T4 must be checked against the circuit diagram as only one anchoring point for this transistor is provided and it was found impossible to mount certain variable resistors directly without them fouling each other or other components.

No details for the mechanical construction of the camera are provided and likewise much time need be given to matching nuts and bolts to holes in various bits of metalwork. However, the constructor will slowly discover that there is only one way of piecing the thing together and no ambiguities exist. The camera is extremely compact and wiring between case mounted components calls for a fair degree of dexterity, particularly if sufficient slack is to be allowed for the pcb to be lifted for servicing.

The single sheet intended to cover the setting-up procedure is totally inadequate in treating the twenty or so, often mutually dependent adjustments and the constructor is best referred to the series of articles by Graves in "Television" magazine. Access to an oscilloscope is naturally desirable to set the output waveform, the pk-pk amplitude of which is adjustable up to 1.4V.

On switching on and having discovered the rather critical setting of the beam and target controls an acceptable picture was immediately obtained albeit upside down. Final grooming of the picture took many more hours. With an amateur grade vidicon and feeding a Philips 326 receiver via a video modulator the camera gave a very good account of itself and well repayed the time spent in its construction. Linearity and picture stability were excellent, the video amplifier providing a well-contrasted picture with no smearing and a horizontal resolution of at least 450 lines. The automatic sensitivity control worked very effectively and on a moderately illuminated scene little change was noticeable over 2 f-stops. The camera is very sensitive, discernable pictures being obtained in an average-sized room lit only by a single candle, the noise content only becoming apparent at such low levels of illumination. There was slight hum content in the signal, the cause of which could not be discovered, which was just visible even on bright scenes. Slight patterning introduced by the head amplifier, despite the shortest possible target lead, appeared when the top cover was removed and care must be taken to scrape away sufficient paint to ensure that the cover is effectively earthed. The case itself is neat and well finished although a number of holes had to be enlarged. The camera runs quite cold when in use and since the initial setting of the controls, all of which are internal, no further adjustment has been necessary in several months.

At about £82 (inc. VAT but exclusive of vidicon and lens) the kit seemed a little overpriced especially since it can hardly be considered as a kit in the normally understood sence and that a very good secondhand camera could be obtained for this amount. However, good quality components are supplied and the value of the mains transformer, metalwork and scan coils is difficult to assess; and there is glory in having built it oneself. Despite Crofton's claim that it is all British, the scan coils (a very neat assembly) are Japanese, and the variable resistors are Spanish. In conclusion however, the camera may be recommended to the constructor who has the time and inclination to treat this as a long-term project rather than something he can rush off in a couple of evenings.

POSTBAG

R.K. Mathews of St. George's, South Australia, wrote recently to say he won't be renewing his membership as he's away from home so much he has no time for amateur television! We'll forgive him since he offers C Q - T V his best wishes! He does send us news of the Adelaide tv Group - they have successfully operated he tells us. It translates tv signals from the top end of 70 onto 576-585 MHz band, which is ch. 36 on Australian tv sets. John Ingham is the driving face behind this project; power is only 2 Watts, but the whole of the metropolitan Adelaide is covered!

Graham Baker ZL1TOF of Aukland, New Zealand, wrote to offer articles for publication in C Q - T V - no need to offer, just send them in! Any tv subject, and your subject seems more than usually interesting. Graham was intrigued by Ray Howgego's article in C Q - T V 100 on flying spot scanners; he has an old valve unit which resolves 400 lines and was some of the first equipment in New Zealand designed for 405.

Continued on page 44

WHAT IS A DEMONSTRATION

Malcolm Perry G8AKX

What does the general public know about amateur radio? What is the purpose of putting on a demonstration? Just two of the questions to be considered when putting on a station at various functions (I am not including mobile rallies and the like intended soley for the radio amateur).

The general public can be divided into various groups. The largest group know nothing of or about the hobby of amateur radio, except the Tony Hancock image of bungling incompetance, or the man next door that causes havoc with the television or hi-fi. Not the best image to say the least. A minority group have a passing knowledge of the hobby from SWL'ing or having aquaintances that are interested. Therefore a demonstration station is the ideal way of getting across to the public the ideas and aims of the hobby of amateur radio. So with this in mind, put yourself in the position of Mr. General Public. You walk into a room and see the back of a man who is talking to a black box. Something we see every day on the television. So we walk out. If we are slightly interested we decide to stop. We then try to ask some questions. "Ssh, I'm on the air" is the reply from a faceless head. An interested short wave listener asks how much the gear costs he may be luckier in a reply to his question, there being no contact in progress at that time. Well, he is told, this one here is £400, that one is £600 or this one here is £500. Plus a few hundred for masts and aerials. The SWL decides to take up stamp collecting, and who can blame him?.

During a demonstration of amateur TV a voice from the back piped up "I get a better picture than that at home!" Who was to blame for that remark? The person for not understanding the complexities of transmitting and receiving TV, or the demonstration for not trying to explain what is involved.

At this point let us stop and think. What so far, have we demonstrated to the public? Very little. There is no easy answer, but next time you put on a station at the local flower show (or the like) stop and think. Ask yourself "Why am I putting on the station?" If it is just to have some contacts from a different location, then by all means, take your black box, and leave Mr. General Public as ignorant as before.

If the answer is to try and demonstrate the hobby of amateur radio, then put yourself in the position of someone that knows nothing about radio and try to make the demonstration eye and ear catching to make the public stop and take notice. With some means of simply explaining what is going on.

With this in mind and a bit of thought, we may be able to get over to the public what amateur radio is really all about. I do not propose to know all the answers, or to offer suggestions. All I intend is to provoke you into thinking about what is an excellent opportunity to give radio a better image to the public, which I think you will agree, cannot be a bad idea. If you have found the answer or have any ideas, why not get them published so others may benefit.

PROJECT 100

PART 3

by Eric Putt and Tom Mitchell G3LMX

A PAL COLOUR PATTERN GENERATOR and SYNC PULSE GENERATOR

Colour Pattern Board

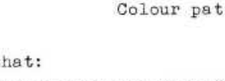
This has now been designed and tested.

Boards have been ordered and should be available from Club Sales by the time you receive this issue.

As some of the logic has been redesigned as envisaged in Part 1, the patterns are not quite as demonstrated at A.P., and a facility has been included for an on-board clocking oscillator when used with other spgs.

The castellations around the grille have been improved and the chequerboard circuit changed. As a result, the edges of the coloured areas occur half-way between the grille lines.

The biggest change has been the simplification of the external control wiring, which has been reduced to earthing four control lines. These can be operated by 4 single pole switches, connected to points marked GS, G,P, and C on the circuit. However, it is recommended that a bank of 4 Interlocked/latching switches is employed, wired in the sequence shown in Fig. 1. In this case useful additional patterns are produced by pressing adjacent buttons.



All out	Black & burst	GS + G	Grey Scale + Grille
GS	Grey scale with burst	G+P	Chequerboard
G	Grille. No burst	P+C	Purity check (red) plus burst.
P	Purity. White. No burst		
C	Colour pattern		

Note that:

a) Burst is removed with Grille only pressed.

b) Colour control always restores burst.

OSCILLATOR

The crystal oscillator operates at 4x Subcarrier, 17.734475 MHz and requires a fundamental mode crystal callibrated at 30 or 32 pf parallel resonance.

The transistor TR1 is not very critical. Most high gain silicon NPN types should work.

However, plastic types such as the BC182 appear to be better than those in metal cans which we have tried so far. For oscillator stability the AOT resistor connected to emitter of TR1 should be as high a value as possible, without stopping oscillators at 17 MHz,47 ohms is typical but depends on crystal activity. If crystal does not osciilate first time check by shorting out this resistor.

OUTPUT STAGES

These may look rather elaborate. The problem is in designing an output stage which will give on volt into 75 ohms using the same 5 volt supply as the TTL logic.

The luminance components are mixed into TR2 emitter and the linearity of the staircase depends on the accuracy of these components. Provision is in fact, made on the board for installation of two resistors in parallel to allow adjustments to be made for best results.

The colour and syncs are fed into TR2 via inductive circuits. The crominance path via L1 and 33pf is series resonant at subcarrier and shapes the burst. L2 is part of a low pass filter which shapes the sync rise time.

Values of L1, L2 are not over critical and can be bridged out for initial testing. In my case I found that using some small two-hole ferrite cores I had to hand:

L1 required $10\frac{1}{2}$ turns
L2 required $12\frac{1}{2}$ turns.

For cores of this type the inductance is given by $L = a_1 \times n^2$

where a_1 is a constant dependent on type of former. N is number of turns.

Once again the choice of transistor is not very critical. Any high gain silicon NPN type having low capacitance should be suitable. Some types tested include BCY70, 2N3906, 2N3702, BC157

SETTING UP (with P100 Sync Pulse Generator)

MONOCHROME

a) Connect power and pulses from the P100 SPG and check for monochrome patterns. Remember to earth at least one control line (G or GS), otherwise there will be no luminance signal.
b) Earth C and check for presence of subcarrier with scope if available.

SUBCARRIER FREQUENCY

c) Check crystal oscillator is near correct frequency by means of
   1. Counter (reasonable accuracy)
   2. Decoder. (Poor, but will lock monitor or Rx decoder when within a hundred or so cycles).

d) Final s/c frequency setting
   1. Attach a well-insulated lead to output of about 100 pf or so.
   2. Feed monitor or **Rx** with broadcast Video (colour).
   3. Place wire near chroma amp stage in Rx.
   4. Press Purity and colour buttons.
   5. Adjust oscillator for minimum beat or chroma patterning on Rx.

SUBCARRIER TO LINE FREQUENCY LOCK

This is quite simple to do, even if the first instruction seems impossible! Take a lead from the video output near to the aerial socket of a TV Rx tuned to a broadcast transmission and providing the broadcast signal is not too strong, (you may have to remove an outside aerial and use a piece of wire). You should now see some breakthrough syncs, at least from the pattern generator. (Yes, it works')

ON SPG

Adjust 5MHz oscillator for minimum drift with respect to broadcast video. If IC 24 is not fitted yet check oscillator correction moves either side of nominal by earthing. Set and reset (Pins 10 & 13) of IC19 one at a time.

Install IC 24, feed 4 x s/c from Pin 33 of pattern board to Pin 3 (s/c ip) on SPG. Feed Pin 3 of IC 24 (Pin 6 on connector) with waveform 'C' from Pin 11 of IC 7 by means of

a) a direct strap on back of board or

b) linking Pins 6 and 27 on connector and installing a new horizontal link from Pin 27 to the hole near (and connected to) Pin 1 of IC 8. See Fig. 2.

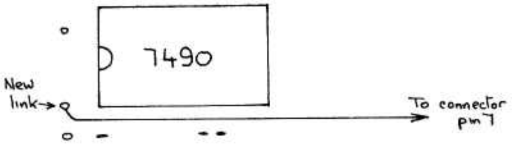


FIGURE 2

The system should now lock. If the colour oscillator has been set as described earlier due to the lack of the 25 Hz offset discussed in Part 1, the line frequency of the pattern will drift to the left at a rate of one line per 11⅓ seconds.

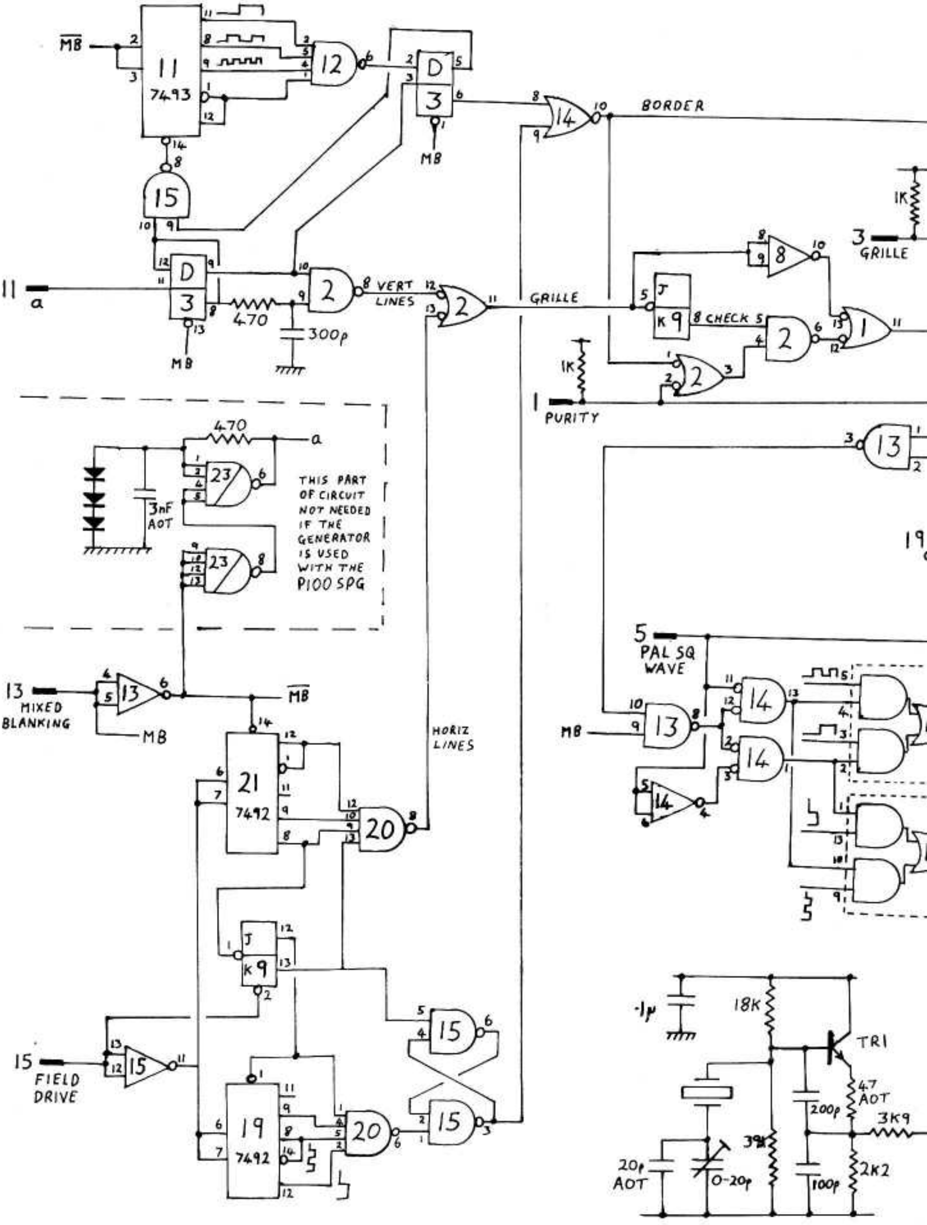
Lock can be confirmed by observing either, the burst on an oscilloscope triggered by line syncs or by observing the subcarrier movement on a colour monitor.

OTHER SPGs

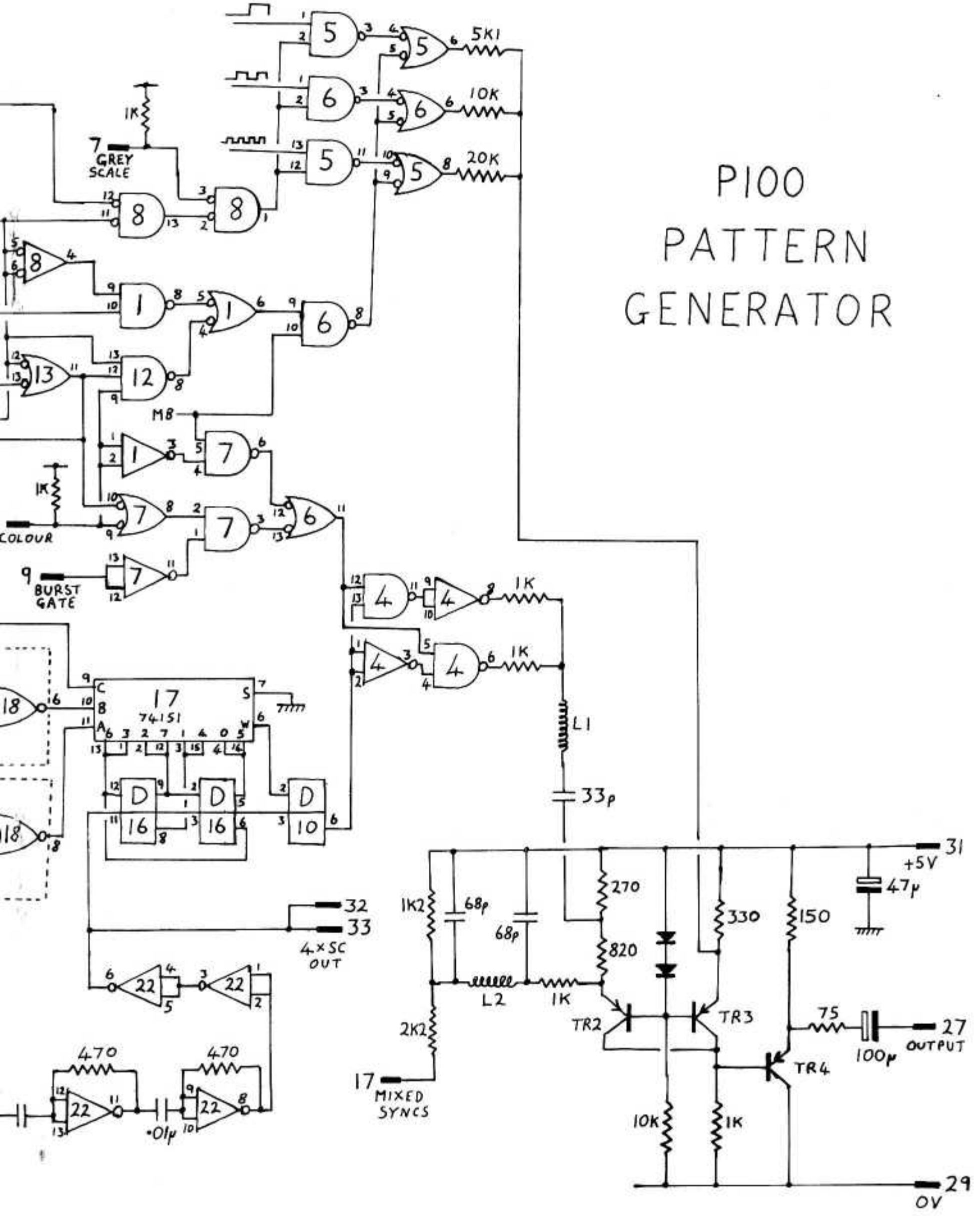
Should you wish to use the Pattern generator with other SPGs capable of interfacing with TTL (See notes on genlock in Part 2), it is possible that you will require an alternative to the 40 x LF clock waveform available on the P100 SPG.

To this end a 7413 line locked oscillator (IC23) is provided on the pattern board. This is adjusted on "Test" until the right hand side castleations just reach the edge of the picture area. If the frequency is low part or all of the picture will be blanked off.
NOTE That this oscillator is voltage dependent and should be set up on the power supply with which it will be operated.

If you have built the SPG with genlock, the colour lock to the pattern generator is disabled automatically by the sync detector when the genlock is enabled.


MB
11
7493
12
D
3
MB
15
11
a
2
470
300p
VERT LINES
GRILLE
BORDER
14
470
a
23
3nF AOT
THIS PART OF CIRCUIT NOT NEEDED IF THE GENERATOR IS USED WITH THE P100 SPG
13
MIXED BLANKING
MB
21
7492
20
HORIZ LINES
J
K 9
15
FIELD DRIVE
19
7492
3
GRILLE
1K
8
9
8 CHECK
1
1
PURITY
13
19
5
PAL SQ WAVE
MB
18K
TR1
47 AOT
3K9
200p
100p
2K2
20p AOT
0-20p
·1μ

P100
PATTERN
GENERATOR



LIST OF SEMI CONDUCTORS

IC 1	7400	13	7400
2	7400	14	7402
3	7474	15	7402
4		16	7474
5	7400	17	74151
6		18	7451 or 7450
7		19	7492
8	7402	20	7420
9	7473	21	7492
10	7474	22	7400
11	7493	23	7413 if required
12	7420	diodes IN4148 or IN914 etc.	

TRANSISTORS

TR1 silicon NPN

see text for suitable types

TR2,3,4 silicon PnP

CONTEST NEWS.

by Peter Johnson G8EIM

PROPOSED NEW RULES FOR ATV CONTESTS AND ACTIVITY WEEKS.

As Contest Organiser for the past year, it has become painfully obvious to me that some new rules are required to get the score points in proportion to the effect of the band in use. Also the rules need to be simplified. The following is compiled from comments received by letter from Germany, Belgium, France and GB.

RULES

ITEM

1. Session 1 Day 1, 1900-2300 GMT
   2 Day 2, 0800-1200 GMT
   Activity weeks Day 1 to 7, 0001 to 2359 LOCAL TIME

2. Entrants, all licenced amateurs

3. Fixed and portable stations A & (B=Portable)

sound and vision transmit and receive	70 cms, 2 point/km
sound and vision transmit and receive	23 cms, 8 point/km
sound and vision transmit and receive	2.4 GHz, 16 point/km
sound and vision transmit and receive	3.5 GHz, 32 point/km
sound and vision transmit and receive	5.7 GHz, 64 point/km
sound and vision transmit and receive	10.0 GHz, 128 point/km
sound and vision transmit and receive	24.0 GHz, 256 point/km

All S & V Tx & Rx may use 2m for talk in

All Rx stations get ½ points for vision received and must have confirmation in Tx stations contest log.

The Tx station may also claim ½ points if Rx station confirms in sound all vision details by return sound Tx, not telephone.

Receiving pictures without confirmation but by submission of log sheet copy will gain ¼ points per km per band.

4. Exchange of data + log entries

In all cases

a) Callsign in vision & sound
b) QRA in vision and sound
c) Serial number in vision and sign
d) QTH in sound only

LOG ENTRIES

Station log must contain all other required information as required in Statutory Regulations of licence.

Contest Log entries from each station must contain all other information of station as before such as:

Report sent/received
QTH in full. Nearest town distance stated etc.
QRA
Serial numbers
Points scored
Km recorded for each contact.
Callsigns
Frequency Tx
Frequency Rx
Total score
Name
Date, year
Contest
Best Dx
Details of Tx Rx and/or other equipment.

Please not 4 weeks or 28 days for all contests. This is the maximum period in which log sheets must be returned to the organiser. They will not be accepted after 28 days from the date of close of contest.

This limit is imposed entirely due to publishing times in each country.

1HZ-450MHZ DIGITAL FREQUENCY METER WITH SIX DIGIT DISPLAY.

PART 2

by Peter Johnson
G8EIM

FIG 1 & FIG 5 - PCB 1+2

Put the appropriate Xtal into a 2" cube of Jabalite (expanded polyurethene) wrapped with sellotape. Leave the wire ends sticking out from the middle of the package. Assemble all veropins onto PCB 1+2, then fit all ICs; solder each one into position separately. Check each

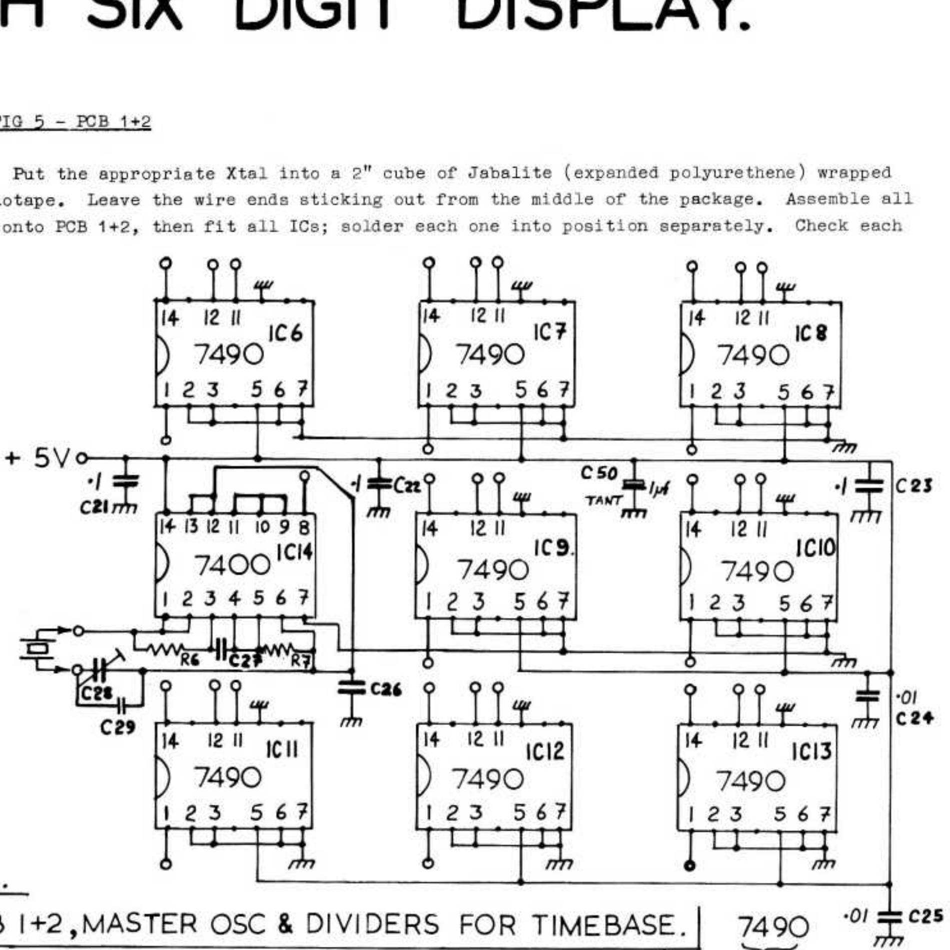


FIG I.

PCB 1+2, MASTER OSC & DIVIDERS FOR TIMEBASE.

10.MHZ OSC.	C28 = 3-30PF	C27 = 20PF	C26 = 100 ± 50PF
5. "	" "	" "	" = 100 ± 250PF
2. "	" "	" " = 1n	" = 100PF,470.
1. "	" C28+C29 3-30+15PF	" = 4n7	" = 1000 PF

7490

PIN 14 = ÷ 2 IN
" 12 = ÷ 2 OUT
" 1 = ÷ 5 IN
11 = ÷ 5 OUT

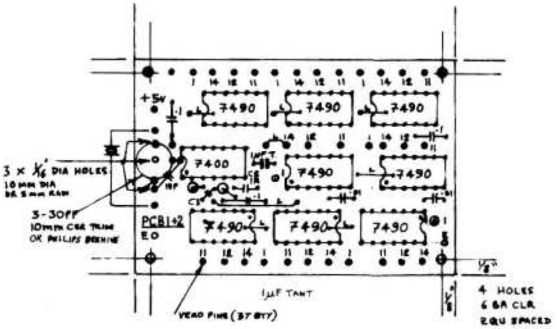


FIG 5.

time to see that they are correctly fitted. When satisfied, assemble the remaining components, R's and C's etc.

Connect links between dividers as required for the Xtal chosem, Fig. 1 x 10. Check that all components are fitted correctly; connect Xtal at end of PCB. This will need about 2" of wire protruding from the Xtal Box. Place PCB 1+2 with Xtal box attached (also 5V Rail) into the position shown in Fig. 9. Bolt into position. Connect +5 rail to PSU via a meter on ½ amp range. Switch on PSU and meter should read 175 - 250 mA; if not, check MO with a scope to see if it is oscillating - continue checking each divider by feeding MO output to each divider input pins. If all works disconnect mains. Complete wiring of links as per circuit Fig. 1 and Fig. 10. Connect wires to switch - mount the switch, cut wires to length and solder to appropriate pins. Set MO capacitor half way; this will be very near 1MHz. Check with PSU on again and see if all the correct signals are available at S3-S4; an off-air Rx or communications Rx will do this check, but a scope is better to see the pulses. If all is OK, check MO against Droitwich 200KHz. Use the cal. out to feed the Rx, time MO for zero beat.

Common faults are as follows:

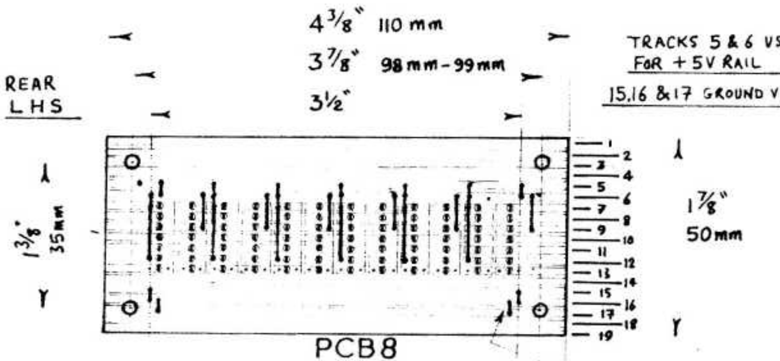
Dividers wired backwards, missing links, missed solder connections on pins of ICs, input-output reversed, Xtal soldered to wrong places on PCB. Always do a visual check several times - it is too easy to be sure you are correct when in fact, a mistake is so obvious. Never leave connections hanging in mid air.

Your TB should now be complete and working before attempting the next PCB, as the pulses from this unit are required to check out the operation of the subsequent PCBs.

FIG. 12 - PCB8

Wiring and construction of display (Veroboard) 0.1" spacing. Cut Veroboard to size, mark out and drill four 6 BA holes. Mark out position of sockets on tracks, track side cut between tracks as shown using a vero face cutter or drill bit of appropriate size. Follow the dimensions carefully (use a small 15 watt - 25 watt max. soldering iron).

TOP REAR TRACK SIDE



PCB8

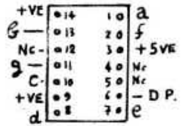
BOTTOM REAR TRACK SIDE

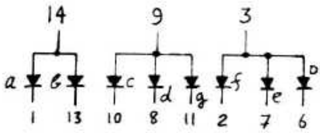
TRACKS 5 & 6 USE FOR +5V RAIL

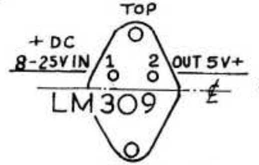
15,16 & 17 GROUND VIA 6BA BOLTS

ALL LINKS SHOWN MUST BE MADE ON OTHERSIDE FACE SIDE

TOP REAR VIEW DL707

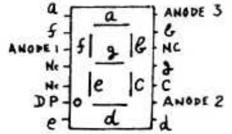






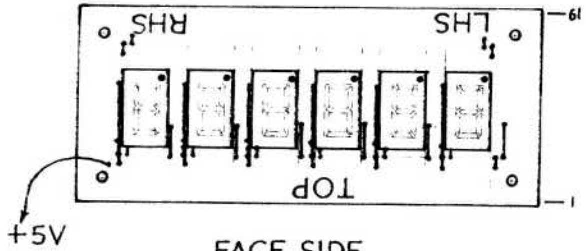
CASE 3. NEG

REAR VIEW



FRONT VIEW

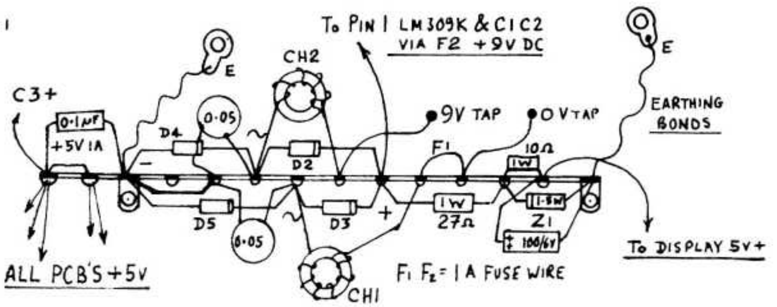
DL707, MAN1, SLA1.



FACE SIDE

FIG12 PCB8. DISPLAY.

PSU TAG STRIP DETAILS



F1 F2 = 1A FUSE WIRE

Place links for positive 5V connections on face side of veroboard and solder into position as flat as possible.

Stick a piece of thin black paper or card over face side of veroboard and pin the holes for the sockets and fit 5 sockets to the veroboard making sure each one is seated correctly. Sellotape into position and firmly solder sockets into position. Cut to size a 6-qay strip of wire, long enough to reach Decimal Place(DP) pins and the front panel switch (12" long wire). Solder one DP from each socket from left to right rear view; cable goes off to the RH side rear view (see diagram).

Offer up the display to the void in the chassis and make sure it fits, all four holes for mounting should be ready. The perspex and gel are fitted on the front panel and approx. ½" standoffs at rear are fitted to hold display into correct position. Some D.F.M.s are made with the display bolted to PCB3 and not to the front panel utilising two right angle brackets so that PCB8 and PCB3 are effectively one unit. The window is fitted separately to the front of the chassis.

Place PCB8 to one side and continue the next PCB (PCB3).

FIG" 2 & FIG. 6 - PCB3

Refer to the circuit diagram. Collect all components required to assemble this PCB. Connect all links as required. This must be done before any ICs are mounted, especially the 5v + Rail links which are underneath the 7475 ICs. NOTE THE NON-STORE VERSION - links are also connected at the SN7475 position i.e. Pin 2 to Pin 14, Pin 3 to Pin 13, Pin 6 to Pin 10 and Pin 7 to Pin 9 at all six positions. These links are shown dotted on Fig. 2 the circuit diagram.

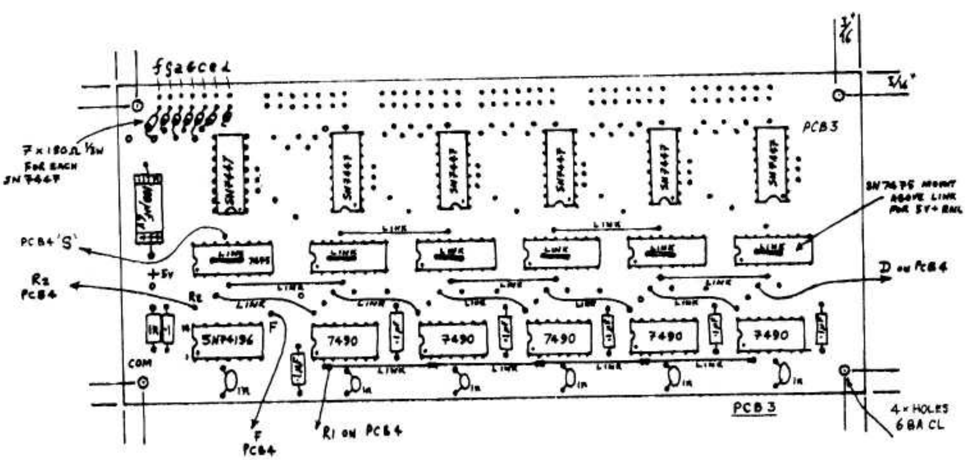
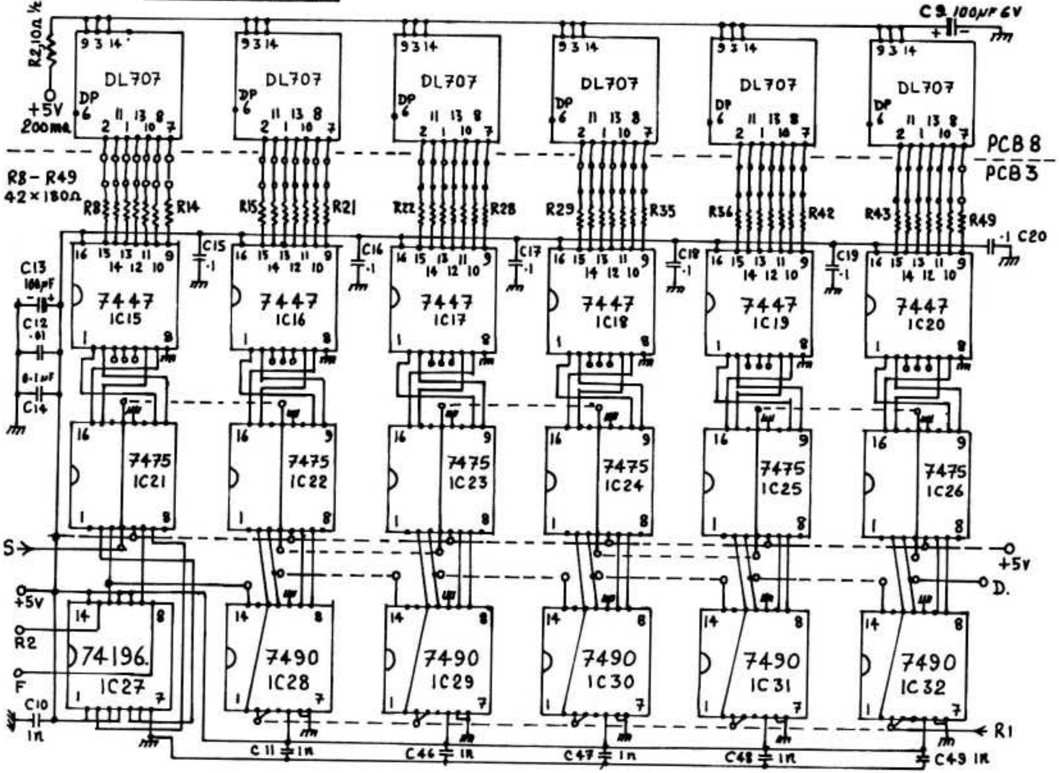


FIG 6.

FIG 2 PCB 3


R2 10Ω ½W
+5V
200mA
DL707
9 3 14
DP
6
2 1 10 7
11 13 8
PCB 8
PCB 3
R8 – R49
42 × 180Ω
R8
R14
R15
R21
R22
R28
R29
R35
R36
R42
R43
R49
C9 100μF 6V
C13 100pF
C12 ·01
0·1μF
C14
C15 ·1
C16 ·1
C17 ·1
C18 ·1
C19 ·1
·1 C20
7447
IC15
IC16
IC17
IC18
IC19
IC20
7475
IC21
IC22
IC23
IC24
IC25
IC26
74196
IC27
7490
IC28
IC29
IC30
IC31
IC32
S
+5V
R2
F
C10 1n
+5V
D.
R1
C11 1n
C46 1n
C47 1n
C48 1n
C49 1n

STORE VERSION

Fit one IC at a time. Sellotape them into position and check each one is fitted correctly. Solder only the pins of the IC that are used- isolated lands need not be soldered. Complete each IC in turn checking that each one is correctly placed on the PCB. When all ICs are fitted, proceed with the other components.

42 x 180 ohm resistors, and then all the capacitors, fit at least 21" of lead length from each vero pin position D,F, R1,R2, S and +5v connection. Check again that all solder joints are soldered. Proceed to solder the 7-ways for each display connection.

Prepare three 3" lengths of 7-way cable and 3 x 4" lengths, strip back ⅛" insulation at each end of all connections. Insert the ends starting at LHS opposite 74196 IC. Keep the colour code the same for each seven connections so that each display is coded the same, seven different colours.

Proceed across PCB3 with three 3" lengths then three 4" lengths from LHS to RHS- the LHS is the end which has the 100uF/6v. Pre tin the ends of the wire in readiness for soldering to the display - leave only 1/16" tinned wire at ends.

Connecting PCB3 to Display Veroboard PCB8 (Looking at rear side of PCB8)

Connect from LHS to RHS the 7-way cables from PCB3 identical pin connections for each display a-a, g-g etc. Colour code makes this quite easy. Check each display pin as soldering in 15 completed look out for accidental solder bridges across the verotrack. If all clean, prceed with each connection. When all connections are complete, check again. Plug in display DL707s carefully into each socket. Make sure they are fitted the correct way up. Care with the pins of the displays as they are quite fragile. Check again that there are no solder bridges across tracks.

PCB3 & Display PCB8 Check Out

To check operation of PCB3 and display, connect +5v to supply from P.S.U. Observe all six displays should light with either Random Numbers or zeros. Ground the R1 Reset One line from the 7490s, connect output fn from time base switch to "F" input to 74196. Counting should commence from Right to Left; 0 to 9, carry one to 9 etc. If fn is not yet wired, just connect a wire from the time base dividers at say 1000 Hz or 10,000 Hz, this should give more rapid counting. If this does as above, all is OK with PCB3 and display. If no digits light up, check supply to display. If no counting, check that R2 and 5 are not grounded, check R1 is grounded. Failing all re-check, all solder connections on PCB3 and especially links, IC pins etc correct orientation. Check all wiring to displays; check if displays are plugged in the correct way up.

Most faults are due to pins of ICs being missed and not soldered, dry joints as well. Wiring of the display veroboard has proved to be the most difficult part of the Project, and lots of mistakes have been made with the display - just plain wiring errors! Plus wrong track connections and bridged tracks when too much solder was applied.

FIG.3 & FIG.7 & FIG. 10 - PCB4

Logic control, assemble components as required by the circuit diagram Fig. 3, conn-

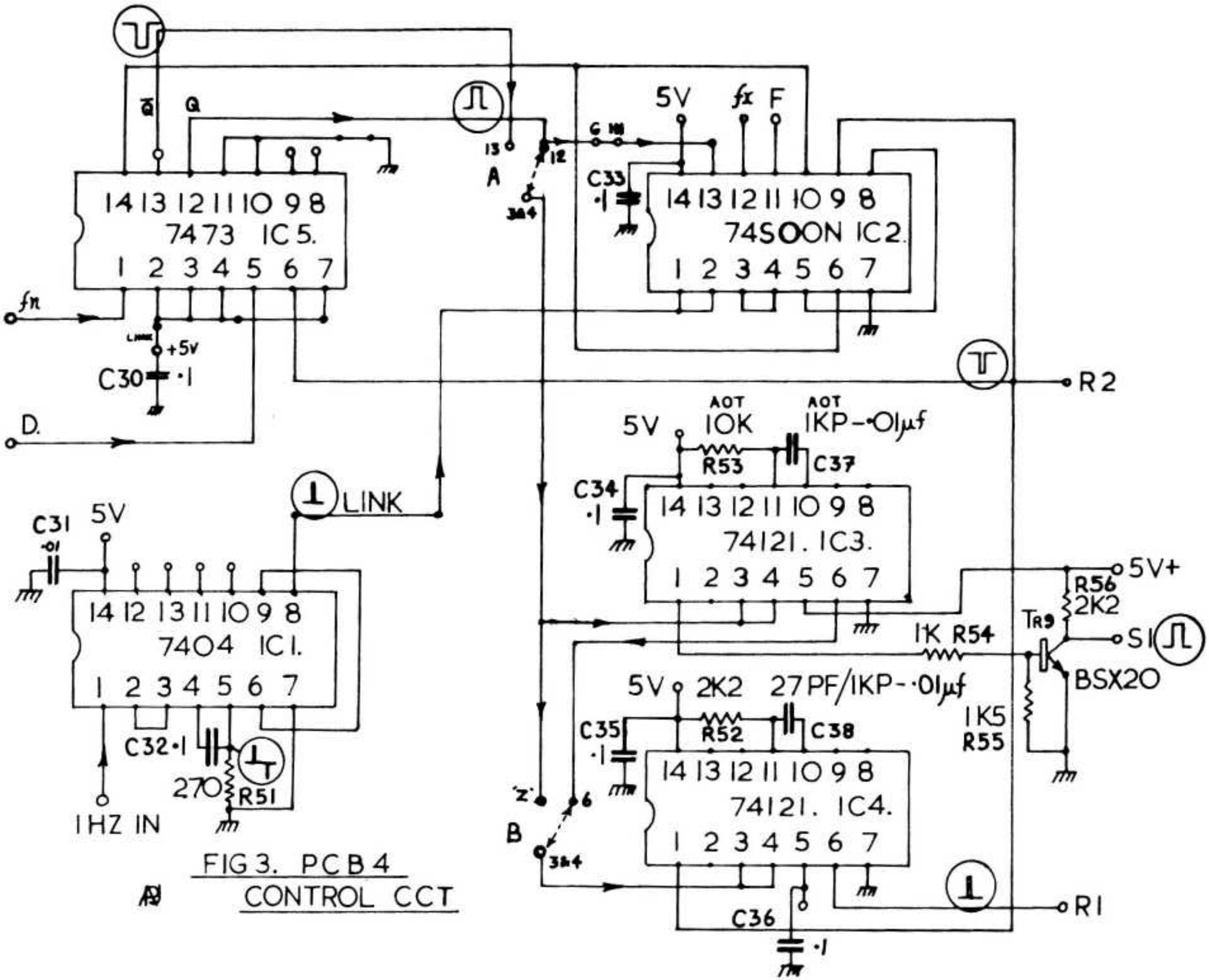


FIG 3. PCB 4
CONTROL CCT

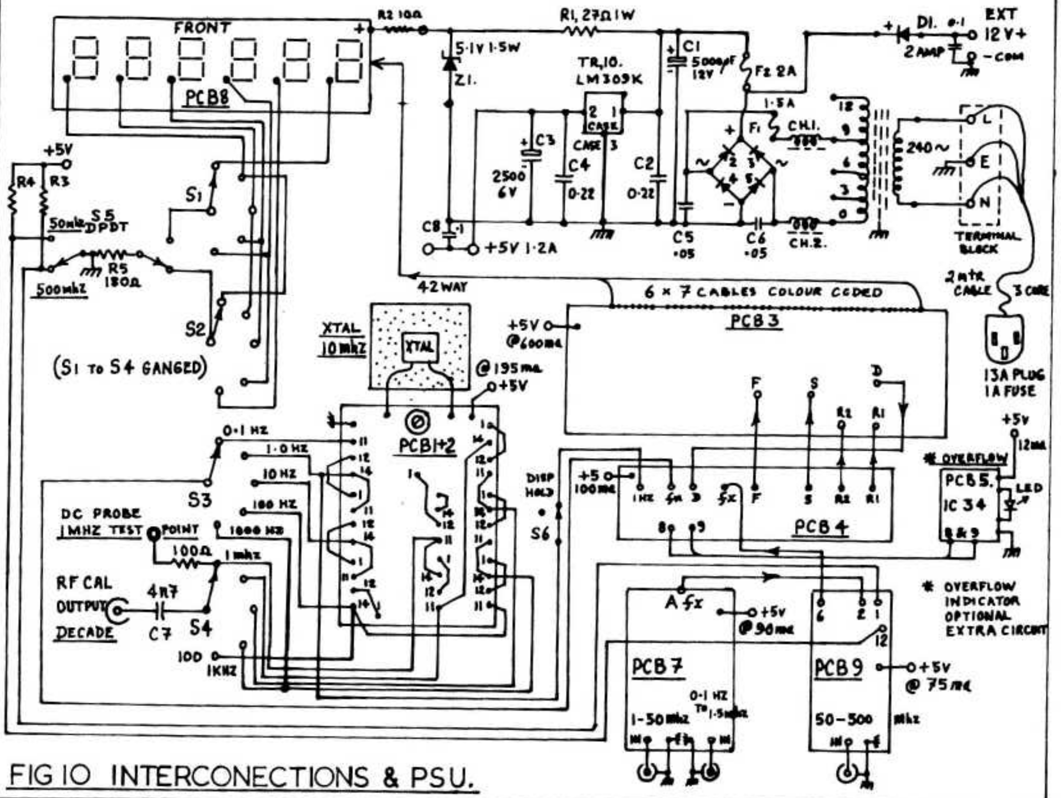


FIG 10 INTERCONECTIONS & PSU.

ecting links as described to do the function required - store or no store. After fitting all links check the ICs are mounted correctly before soldering them onto the PCB. The transistor for the Store pulse output is a BSx20 or equivalent High speed switching type. A metal plate on which PCB4 is mounted should now be cut to size, drilled and fitted above PCB3 via long 6BA bolts tubes spacers etc., the holes all pre drilled to accept PCB3, PCB7 and PCB9. PSU tag strip may now be mounted in the correct position.

Attach PCB4 to the plate in the prescribed position; connect all flying connections from switching fn, store, R1, R2, D. 1Hz from time base, +5v rail, and F to F.

Switch unit on again and check all the pulses are present. R1, R2 and 5 are very narrow pulses. Connect fx to TB 500 KHz Pin (temp. connection to test logic) 0.50000 or .500 000 should be displayed on position 1 or 2 of range switch. 1MHz to fx input on PCB4 should produce all .000.000s or 999.999s with an external 1 MHz oscillator.

Callibration of the time base switch is best left at simply 1-2-3-4 or 5, if a 5 position switch is used. Any other form of calibration of this switch becomes very misleading. A freeze display or release display switch may be inserted in the 1Hz line for NON STORE version or in the Time Base Feed to fn for the STORE version.

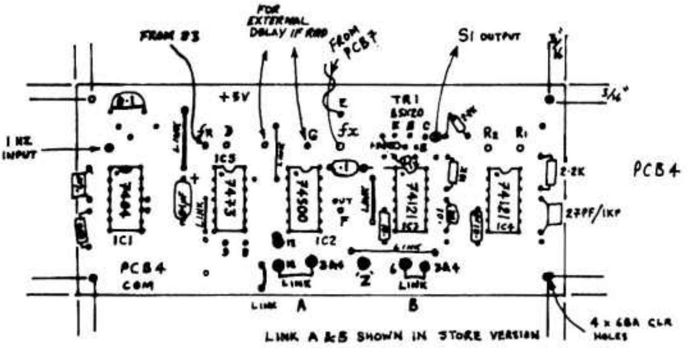


FIG 7.

Links A & B are shown For Store Version

PCB7 - FIG.7 & FIG.4

Input amplifier. Assemble all components as per circuit Fig. 8 and Fig. 4. Proceed by fitting resistors, capacitors, diodes, transistors and the IC. Run a twisted pair from the output pin, join earth wire to board. Inputs may be a lightly twisted pair of co-ax cable. Bolt down on position shown in Fig. 9. Connect fx to twisted pair output. Join input connections to sockets.

Connect 5v rail via a 200mA range on meter and switch on current should be approx. 100mA or less.

Pin 12 and 13 of IC 74S00N must be joined - see PCB and Fig. 4. Transistors TR2, TR3,

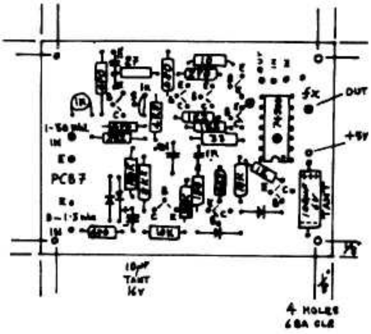


FIG 8.

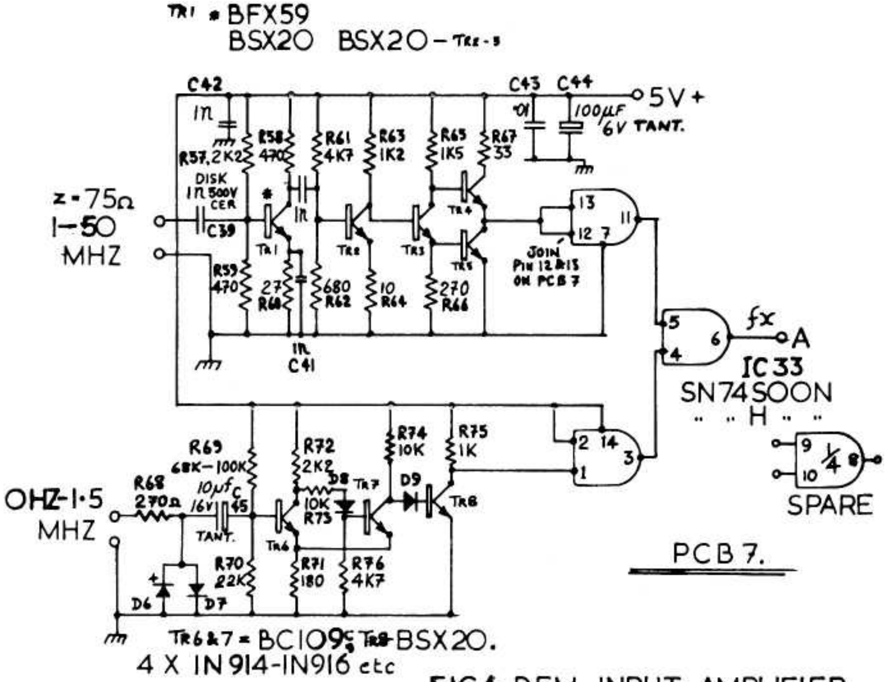
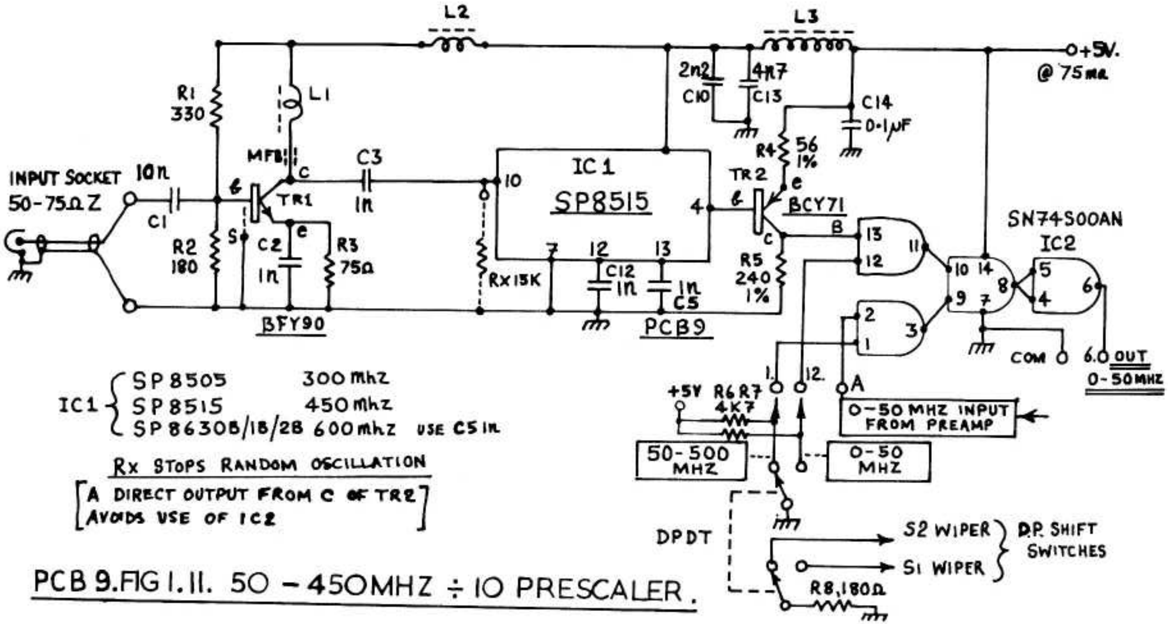


FIG4. DFM INPUT AMPLIFIER

TR4, TR5 may need to be selected in their respective positions if TR4 gets very hot. Maximum frequency may also not be as high as it could be. Transistors TR6 TR7, TR8 should all have very high B or gains, Thus it is found that whilst some BSX20s may work a problem develops with the automatic switching of the signal path. For high and low frequency inputs, changing round the transistors usually cures the fault. TR6, TR7 are BC109; TR8 BSX20.

BATC. 3·4·77



IC1 { SP8505 300 mhz
SP8515 450 mhz
SP 8630B/1B/2B 600 mhz USE C5 1n

Rx STOPS RANDOM OSCILLATION

[A DIRECT OUTPUT FROM C OF TR2
AVOIDS USE OF IC2]

PCB 9.FIG I.II. 50 – 450MHZ ÷ 10 PRESCALER.

GENERAL HINTS

Identification of ICs (Integrated Circuits)

1. Pin 1 is given by a dot or indent next to the pin on the top end surface of the IC. The alternate method is a crescent cut-out at one end, looking from the above position Pin 1 is top LHS of the crescent - crescent end facing away from view.
2. Do not use sockets for this project - other than the display DL707/LHDP.
3. Values of capacitors used for decoupling are extremely wide tolerance for the 5v + Rail.
4. Make sure the reset pulses are not reversed i.e. R1 swapped with R2.
5. PCB7 short stand off pillars for maximum frequency response (⅛" or 3/16")
6. When utilising cheap capacitors make sure they are not O/C or S/C.
7. Mechanical - The flanges of the lid tend to scratch the front painted panel - bend the flanges out with pliers to avoid this. Makes a looser fit.
8. PCB3 do not forget to position the +5v links before fixing the 7475 ICs into the PCB. If you do forget a link may be provided in an alternate position - See Fig. 6. Note extra holes for +5v Rail.
9. DL707s - Care should be taken when fitting these into sockets as pins may be bent out of place and not make a connection.
10. Check PCB3. R1 to ground R2 floating S floating F connected to 100 KHz or 500 KHz should produce a running count from Right to Left. D floating provides a pulse at every 8 displayed at LHS digit. Do not short out.
11. Pin 13 IC2, PCB4 - Gate link to pin 12, IC5, when NO STORE version of the counter is constructed this link may be broken and the delay inserted to produce gate delay - see sheet 16. This only a refinement to reduce counting errors in the NON STORE version of the counter.
12. PCB7 Recommend BC109C for input amp TR6, TR7. Very high gain transistors are required for these positions. A switching type transistor is best for TR8. BSX20 = TR8.
13. The 2" cube of expanded poly. i.e. Jabalite Ceiling Tile must not be less than 2"x2"x2" if temporary stability is to remain within tolerance.
14. Check all PCBs before final assembly.
15. When testing make sure test equipment has correct earthing so no potential voltage difference exists.

FIGS. 1 & 8

Components List, Master Oscillator and Divider PCB.

REF.	QTY	TYPE	MANUFACTURER
	1	Crystal of choice or 1 MHz	
		Xtal HC6UW Wire ended .005 tol	Interface Quartz Devices
C1	1	3-30PF 10mm Ceramic Trim or	
		3-30PF	Phillips Concentric
C2	1	4n7 Minature Ceramic	
C3	1	4n7 Minature Ceramic	Mullards/RS
C4	1	0.1NF minature polycarbonate	Mullards/RS
C7	1	0.1NF minature polycarbonate	Mullards/RS
C8	1	0.1NF minature polycarbonate	Mullards/RS
C5	1	0.01NF Minature Ceramic	Mullard/RS
C6	1	0.01NF Minature Ceramic	Mullard/RS
R1	1	1.5K 1/8 watt Carbon Film	Mullard/RS
R2	1	1.5K 1/8 watt Carbon Film	Mullard/RS
	38	Vero Pins are used for PCB1+2	

4		⅜" 6BA Spacers
4		⅜" 6BA Bolts & Nuts lock washers
8 or 6	x	ICs Type SN7490
1	x	ICs Type SN7400
1	x	1NF 6v Tant
1	x	PCB1 + 2

PCBs Available mail order from P.A. Johnson, 38 Kynaston Wood, Harrow Weald, Harrow, Middx.

				ALL PCBs
PCB	Prices	PCB1+2	£1.60	Fibreglass Tin Rolled & Drilled
		3	£3.00	Fibreglass Tin Rolled & Drilled
		4	£1.60	Fibreglass Tin Rolled & Drilled
		7	£ .90	Fibreglass Tin Rolled & Drilled
		9	£ .80	Fibreglass Tin Rolled & Part Drilled
	If ordered separately		£7.90	
	One complete set		£7.10	Saving 10% = 80 pence

Ex-stock delivery 3 - 6 weeks dependent on order quantity.

1 piece of red geletine may be supplied with each set of PCBs as requested with the order.

Prices subject to change ±

FIG.4 DFM INPUT AMP. Components List

Ref.	Qty.	Type
TR2-TR5	4	BSX20
TR1	1 only	BSX20 or BFX59 in order of price and gain
TR6-TR7	2	BC109C
TR8	1	BSX20
DIODES	4	IN4141 or IN914 or IN916 or IN4148
ICI	1	SN74S))N,Texas SN74S00AN
TANT	1	100NF/6v (or Electroletic)
TANT	1	10NF/16v
CAPS	1	500v on DISK CER
CAPS	3	50v IN DISK CER
CAPS	1	0.01NF DISK CER 50v
RESISTORS	3	470 ohms
RESISTORS	2	2.2K
RESISTORS	1	27 ohms
RESISTORS	1	180 ohms
RESISTORS	1	10 ohms
RESISTORS	2	4.7K
RESISTORS	1	1K
RESISTORS	1	1.2K
RESISTORS	1	1.5K
RESISTORS	2	10K
RESISTORS	1	22K
RESISTORS	1	100K - 82K S.O.T.
RESISTORS	1	680 ohms
RESISTORS	1	270 ohms
PINS	10	Vero Pins 0.1 Veroboard type
RESISTOR	1	33 ohms

PCB	1	PCB7 DFM INPUT AMP.
NUTS/BOLTS	4	6 BA ½" + 3/16" stand offs use Nuts.

Components List PCB4 Control Circuit

PCB4	1	PCB4 Control Logic PCB
IC	1	SN7404N
IC	1	SN7473N
IC	1	SN74SOOAN Texas only
IC	2	SN74121N Only one if Store ICs are not used
RESISTORS	1	270 ohms
	1	2.2K
	1	1K
	1	1.5K
	1	2.2K
	1	10K If Store is used. Delete if not
CAPACITORS	1	27PF If Store is not used
	1	1000PF If Store is used
	1	1000PF - .01NF If Store is used .01NF Preferred Value
	2	.1NF
	3	.01NF - .1NF
PINS	16	Vero Pins as before
NUTS/BOLTS	6BA ⅜" Nuts, Washers Stand offs ⅜" x 4	

All transistors and ICs may be obtained from TECHNDMATIC LTD., MAIL ORDER
54 SANDHURST ROAD,
LONDON N.W.9

Also complete sets for this project

Components List PCB3 FIG.6 & FIG. 2

ICs	QTY.	Type	
ICs	1	SN74196AN Texas only	Technomatics Ltd.
ICs	5	SN47490	
ICs	6	SN7475 Only if store is required	
ICs	6	SN7447	
CAPS	7	In, 50v DISK CER (1000PF)	
	7	O. In Polycarbonates 50v	Mullard/RS
	1	100NF 6v Tant or small Electroletic	
RESISTORS	42	180 ohms ⅓ Watt or ¼ Watt or ⅛ Watt	
PINS	6	Vero Pins as before	
	4	6BA Nuts & Bolts 1½" long	
	4	¾ - 1" 6BA sleeves	
	4	¼ - ½" 6BA sleeves	

Veroboard.	1	PCB8 5" x 2¼" Veroboard 0.1" spacing
Resistor	1	10 ohms ½ Watt
Resistor	1	22 ohms 1Watt If Store and prescale is fitted
Ziener	1	4.7v 1.5Watt Zienner
CAP	1	100uF 6v Electroletic 100uF
	4	1" 6BA Nut & Bolts
	4	⅜ or 7/16" 6BA sleeves/spacers

1	5 x 2¼ x ⅛ PERSPEX CLEAR OR RED PERSPEX
1	Red Gel if clear perspex
6	Displays LIT 707, or DL707,XAN72, Com Anode L.H.D.P.
6	Sockets suitable for above displays 14 Pin dil

PRESCALER COMPONENTS LIST

PCB9	1 off
R1	330 ohms ¼Watt 10%
R2	180 ohms ¼Watt 10% AOT for HFE differences
R3	75 ohms ¼Watt 10%
Rx	15K ¼Watt 10%
R6	4K7 ¼Watt 10% (6 hole FB Phillips)
R7	4K7 ¼Watt 10% (10mm long x 6mm dia.)
R4	56 ohms ¼Watt 1% or 2%
R5	240 ohms ½Watt 1% or 2%
R8	180 ohms only required for DFM
C1	10000PF Weecon Minature ceramic plate capacitor 50v vw
C2	1000PF Weecon Minature ceramic plate capacitor 50v vw
C3	1000PF Weecon Minature ceramic plate capacitor 50v vw
C12	1000PF Weecon Minature ceramic plate capacitor 50v vw
CX	1000PF Weecon Minature ceramic plate capacitor 50v vw
C10	1000PF Weecon Minature ceramic plate capacitor 50v vw
C13	1000PF Weecon Minature ceramic plate capacitor 50v vw
C14	0.1uf Polycarbonate or any small 50v vw capacitor

Cs and Rs from "Birkett", The Strait, Lincoln.

L3	6 turns 26swg enamelled copper on 6-hole ferrite, Phillips wide band former
IC1	SP8515 450 MHz Plessey synthesizer IC Qty. one off from Plessey Agents at £6.30 Premier House, Fairfield Road, Yiewsley West Drayton, Middx. UB7 8E2
IC2	SN74S00AN Texas Technomatic Ltd. 54 Sandhurst Road, London, NW9
DPDT	Minature Switch Jap.
L2	3 turns 26swg enamelled copper on F14 FB 3.5mm dia. x 5mm long, hole 1.5mm dia.

2 x 14 Pin Dil low profile Texas Bases (Technomatic Ltd.)

L1	1½T 26swg enamelled copper on F14 ferrite bead 3.5mm dia. x 5mm long
TR1	BFY90 HFE >50 1000 MHz FT Technomatic
TR2	BCY71 HFE 150 500 MHz FT Technomatic

MFB Minature Ferrite bead 3.5mm dia. x 3mm long, hole 1mm dia.

Specification. Dependent on devices used

Sinwave input 30-500 MHz

Squarewave input 1-500 MHz

Maximum signal 5v p-p into 75 ohm input impedance

Input sensitivity TR1 HFE 60 ≈ 10mV at 50 MHz
25mV at 150 MHz
100mV at 400 MHz

CQ GENERATOR AGAIN!

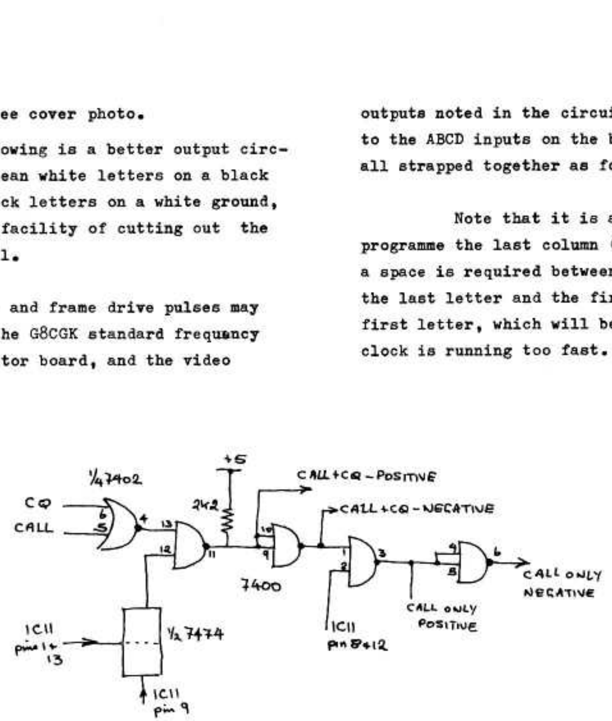
by Grant Dixon G8CGK

For illustration see cover photo.

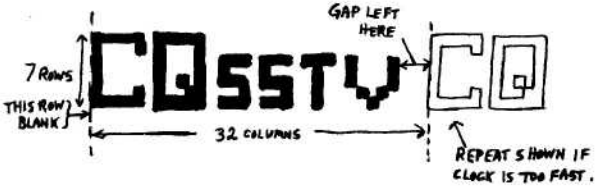
The following is a better output circuit which gives clean white letters on a black background, or black letters on a white ground, with the optional facility of cutting out the CQ part of the call.

The line and frame drive pulses may be obtained from the G8CGK standard frequency and pattern generator board, and the video outputs noted in the circuit diagram can be fed to the ABCD inputs on the board - these being all strapped together as for the chessboard.

Note that it is advisable not to programme the last column (or two columns) as a space is required between the last part of the last letter and the first part of the first letter, which will be repeated if the clock is running too fast.



Here is a suggested programming layout for the CQ line;



LETTER FROM A MEMBER.

Dear Editor,

I hope I am in time to catch the next issue of C Q - T V, for I would appreciate an appeal for information in it.

Since I last wrote for C Q - T V, I have progressed with my ATV station, although not yet "on air". I have a working tuner and pre-amp for reception, although no aerial at the moment makes pictures difficult to receive! This problem should be solved imminently however, as I have brackets on the end of the house plus all the bits for a 48 element 70 cm beam +8XY for 2 meters. This will improve things no end! And at least allow reception of ATV signals.

My DJ4LB is also reaching a reasonable state, with PSU, all switching etc., vision IF Board, vision/sound combiner and vestigial filter completed, although not all tested yet. I've got all the bits for the rest, so the end is in sight!

I am however, already thinking beyond the bare 100mW out of the Tx, and intend to build the two-stage linear from recent "VHF Communication" specifically designed for TV. This will give about 1.5W. I had intended to build the 3-stage DJ3SC design for 18W, but have been persuaded (mainly by an offer of valves + transformer) that a high-power linear would be much nicer.

I would be interested to have your readers' views on linears for ATV (with intercarrier sound) using the ubiquitous 4CX250B. What designs are there, and how does a wideband signal such as ATV perform through them? I would prefer to run two of them..... (4CX-250B's, I mean). I haven't even started looking at the books yet for ideas, but if anyone has a circuit (preferably one with good constructional data), I would be pleased to know the source, plus the drive required to get the legal limit out of them.

Finally, may I wish C Q - T V via yourself all the best for the next 100 issues, for I have found it invaluable as a source of material on many aspects of amateur television.

Best 73's
Norrie Macdonald GM4BVU
3 Townhill Road,
Earnock,
Hamilton ML3 9UX

SUBSCRIPTIONS

Please note that if you have not yet paid your 1978 subscription this is the last C Q - T V you will receive. The address of the Treasurer is printed on the inside front cover.

If your subscription lapses, please remember you will have to pay an entrance fee to rejoin B.A.T.C.

ADVERTS

ADVERTISING RATES

Back page	£12
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Small ads 10 p per line; free to members of BATC.

Advertisements are inserted in C Q - T V on the understanding that advertisers comply with the law and accept responsibility for their wording. They must also undertake to reply to all those who enclose a stamped addressed envelope.

B.A.T.C. Equipment Registry exists to help members of the Club who have equipment for disposal or who wish to purchase some specific item. Send a list of your "wants" and "disposals" to the address inside the front cover of this issue and during the six months for which your application is valid, the Registry will attempt to put you in touch with someone who will buy your surplus or sell you your needs. A s.a.e. would be appreciated when using this service.

B.A.T.C. possesses a Marconi Sideband Analyser which was donated to the Club some years ago. If anyone wishes to use this equipment, could they contact Ian Waters at 39 Stow Road, Stow-cum-quy Cambridge. They will need to provide their own transport.

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Cliff Dykes
17 Aysgarth Court
Sutton Common Road,
Sutton, Surrey.

....

WANTED

Information on converting the DJ4LB ATV modulator to work at 30 MHz and a suitable VSB filter.

S.J. Cowie
28 Conqueror Road,
St. Leonards-on-Sea, East Sussex.

....

FOR SALE

Length of armoured multicore cable, about 60ft. or so, that was intended to operate a Pye Lynx camera remotely.
It consists of two coaxial cores, one smaller than the other, but both presumably 75ohm, three bunches of seven cores, one bunch each of five and four cores, all colour coded, finally surrounded by steel and copper stranded wire as screen and armouring. It is approximately 1" in diameter, and can be buried underground.
I would consider any offer. Buyer collects.

C.G. Richardson,
11a Roseberry Avenue,
Hatfield, Doncaster,
South Yorks. DN7 6JW

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FOR SALE

70 cms ATV receiver, also covers UHF broadcast band. Gives 1v video output. Complete with internal loudspeaker, psu, 70 cms pre-amp £20

Build your own colour monitor, scan unit, RGB amps, PYE PAL decoder. £15 or will split.

D.B. Lawton G6ABE/T G8ANO
Grenehurst
Pinewood Road, High Wycombe,
Bucks. HP12 4DD

....

FOR SALE

Slow Scan T.V. Message Generator with 2 Memory 8 pages, by G8HBR in perfect working order. Offers please or would exchange for fast scan camera, transistorised in working order and with cash adjustment. Please send for information.

Paul Kaminski GM3PIB
5 Tytler Street,
Forres, Morayshire.
IV36 OEL

Continued from page 17

D.H. LeBrocq GJ8GDX from Jersey, writes with a plea; would authors please quote sources of supply for components listed in their articles. Some people do, but some don't. Mr. LeBrocq is having great difficulty at the moment acquring a 2N3731 - anyone help!

Peter Newcombe in Sydney, Australia, is very busy on a colour camera. Writing at Christmas he reports that he is now testing head amps and hopes to start on mechanical details soon. He has a lens, three sets of ⅔" vidicons and coils, and has tested the time base circuits. Best of luck with the project!

I. Pawson of Leicester, writes about his notes on the Project 100 SPG published in C Q - T V 101. The Editor is very sorry and agrees it was someone else's fault, but there were mistakes!
The BC109 in the sync sep. is shown as PNP and the emitter and collector are reversed. In the genlock det. pins 4 and 5 of the second 7400 should not be joined. The unmarked capacitor on the 74121 is 10nf and the resistor goes to pin 11. (That really is too many mistakes for one column, but the magazine was made up over the Chrismas holiday.......)

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A high definition (20 KV EHT) C.R.T. is employed with two photomultipliers feeding two separate video processing channels.

These units are an ideal basis for a "station" caption scanner with minimal modification. The circuit diagram is available.

EVR Player excluding modulator.	Untested.	£14.00
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Group enquiries welcome. No callers PLEASE.

For further details contact Mr Martin on 01 942 8566 or write to 173 Westway, London SW20 9LR

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Camera tubes	EEV Leddicon		£82	nil
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	1" P849 English Electric	Amateur grade	£12.00	nil
	1" 9677 E.M.I.	Amateur grade	£11.00	nil
	1" 9728 E.M.I.	Amateur grade	£11.00	nil
	4½" 9565 E.M.I. Image Orthicon		£10 for two, buyer collects	
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C Q - T V SPG printed circuit board ready drilled			£ 3.00	10p
C Q - T V SPG Genlock Unit printed circuit board ready drilled			£ 3.00	10p

Rapidly increasing postal charges have compelled us to quote the above post and packing charges. Will overseas members please ask for a quotation before sending cash. Obviously, for small items such as lapel badges, adhesive emblems, windscreen stickers e.t.c., one can send several items for the same price as one - please try and estimate the right amount. Our thanks go to those members who estimate on the high side and suggest that any balance can be put to Club funds.

Please send your orders to C.G.Dixon (B.A.T.C. Club Sales)
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PUBLICATIONS

This is a separate department of the Club, do not send orders for publications to Club Sales, send orders to B.A.T.C. Publications
64 Showell Lane
Penn, Wolverhampton
West Midlands.

Slow Scan Television by B.J.Arnold G3RHI published by B.A.T.C. 2nd edition 35p + 8p p&p

A Guide to Amateur Television published by B.A.T.C. price (post paid) £1.50 to members and £2.00 to non members. Overseas postage rates on request.

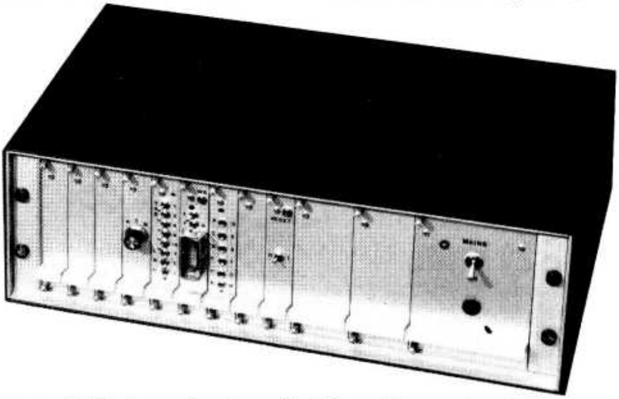
Slow Scan Television Handbook sold out

CQ-TV BACK ISSUES. The following issues are at present in stock: Nos. 67, 68, 69, 73, 76, 77, 78, 79, 80, 82, 83, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99 & 100. The stocks of some are very low and will soon run out. They are: Nos. 67, 69, 73, 78, 79, 80 and 98. Back issues cost 50p each for Nos. 93 onwards and 25p prior to 93. Return postage allowance would be appreciated. Any article which has appeared in the journal can be supplied in photo-copy form at 5p per sheet. Payment for this service should be in postage stamps. A list of all the main articles which have appeared in CQ-TV giving details of how many sheets are needed to reproduce it is available for 40p (preferably in UK postage stamps) plus a large (9" x 4") s.a.e.

PLEASE NOTE THIS LIST CANCELS ALL OTHERS.

Printed by Photoset Litho Ltd., Depot Road, Epsom, Surrey

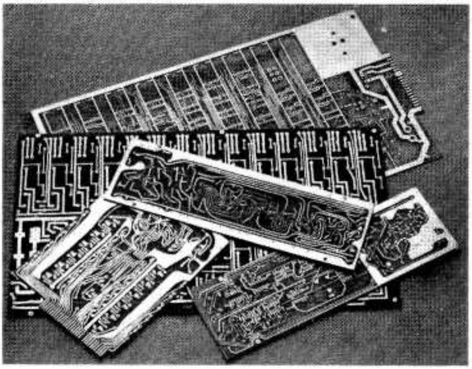
T.V. CHARACTER GENERATOR



The Crofton character generator has been designed to produce upper case alpha, numerics and sundry symbols. The standard keyboard having 60 keys. The equipment will lock to a standard mixed sync source and provide a composite output of 1.4v p-p into 75 ohms.

The standard format provides 3 pages of 16 characters by eight lines. Page select is by simple rotary switch.

This inexpensive instrument will find many applications within the video field for both the professional and semi professional user. Price on application.



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